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**THE DESIGN OF A SANITARY LANDFILL
IN FLOYD COUNTY, GEORGIA**

**A Division of Technical Operations
Open-File Report (TSR 01.93/9)**

written by Harry R. Little, Engineer

**U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Environmental Health Service
Bureau of Solid Waste Management
1970**

CONTENTS

INTRODUCTION	1
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SITE SELECTION

Initial Considerations

Land Requirements	6
Characteristics of Surrounding areas	11
Haul Distance	12
Cover Material	12
Geology	12
Climate	12
Summary	13

West Rome Site

Land Area	14
Surrounding areas	16
Haul Distance	16
Soil Conditions	18
Geology	21
Climate	24

DESIGN

General Considerations

Topographic Map	27
Site Improvements	27
Utilities and Facilities	28
Fencing	28
Plan of Operation	29

West Rome Sanitary Landfill

Topography	30
Site Improvements	30
Utilities and facilities	33
Fencing	33
Plan of Operation	36

OPERATION

General Considerations

Personnel	36
Equipment	39

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Operating Procedures	39
Operating Records	41
Future Site Uses	41
 West Rome Sanitary	
Personnel	42
Equipment	42
Operating Procedures	43
Operating Records	49
Future Site Uses	49
 ACKNOWLEDGMENTS	53
 BIBLIOGRAPHY	54
 APPENDICES	
A Standard Sanitary Landfill Contract Between the NWGRHAC, Inc. and the Counties in Their Region	55
B Quantities of Solid Waste Expected at the West Rome Sanitary Landfill	67
C Lease Agreement Between the Berry Schools and Floyd County, Georgia	72
D Specifications for Equipment Shed and Grease Rack as Set by the Floyd County Engineering Department . . .	97
E Job Description - Heavy Equipment Operator, Sanitary Landfill	92
F Job Description - Caretaker, Sanitary Landfill	94
G Equipment Maintenance Directives	96
H Floyd County Ordinance Regulating Sanitary Landfills	107
I Estimated Cost of Operation and Ownership, West Rome Sanitary Landfill, 1970	113

THE DESIGN OF A SANITARY LANDFILL IN FLOYD COUNTY, GEORGIA

INTRODUCTION

The Northwest Georgia Regional Health Advisory Council, Inc. (NWGRHAC) was organized in order to improve the health and environment of the people of northwest Georgia. Primary financial support for the Council comes from the Department of Health, Education, and Welfare, Public Health Service, under an Appalachian Demonstration Health Grant as authorized by P.L. 90-103, Appalachian Regional Development Act, Section 202, Program 71. Additional funds are provided by the 12 counties served by the Council (Figures 1 and 2).

One of the programs operated by the Council is a project designed to improve the disposal practices for solid waste by the establishment of sanitary landfills throughout the 12 county region. Mr. Joseph W. Hunt, Director of Environmental Sanitation, NWGRHAC, worked with the county officials and the State Department of Public Health in designing a system of 20 sanitary landfills to be operated by the counties under the supervision of the Council (Appendix A).

The Division of Technical Operations, Bureau of Solid Waste Management, was contacted by Mr. M. DeVon Bogue, Regional Director, Environmental Control Administration, and formerly Solid Waste Management Representative, Region IV, to inform them of the Council's activities in the field of solid waste disposal. It was thought that



Figure 1. Location of the area served by the Northwest Georgia Regional Health Advisory Council, Inc.

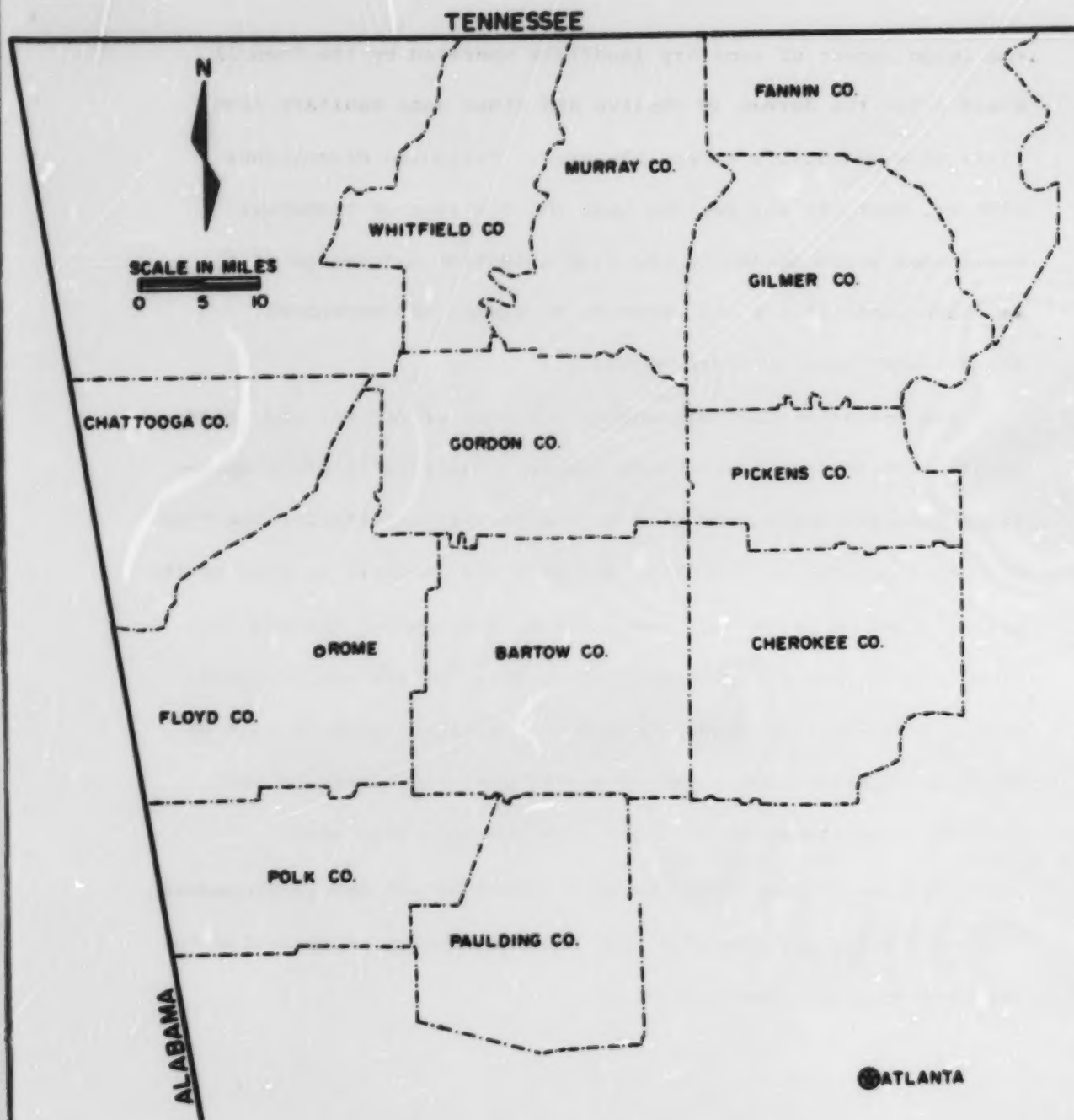


Figure 2. Twelve county area of the Northwest Georgia Regional Health Advisory Council , Inc.

the large number of sanitary landfills operated by the Council would allow the Bureau to observe and study many sanitary landfills in a reasonably accessible area. Following discussions with Mr. Hunt, it was decided that the Division of Technical Operations would assist in the site selection and design of a sanitary landfill for the purposes of giving our personnel actual experience in these areas.

The operation that was chosen for this effort was the third landfill to be located in Floyd County. Sanitary landfill operations had previously commenced at the former dumpsite for the City of Rome (operated by the City) and at a new landfill located northeast of Rome on Potts Road (operated by the County) (Figure 3). Rapid growth, and future growth potential, for the western part of Floyd County indicated a need for a sanitary landfill west of the City of Rome. The physical division of the County by the Oostanaula and Coosa Rivers further heightened this need.

This report describes the site selection and design procedures that were used, and presents the recommended plan of operation for the West Rome sanitary landfill.

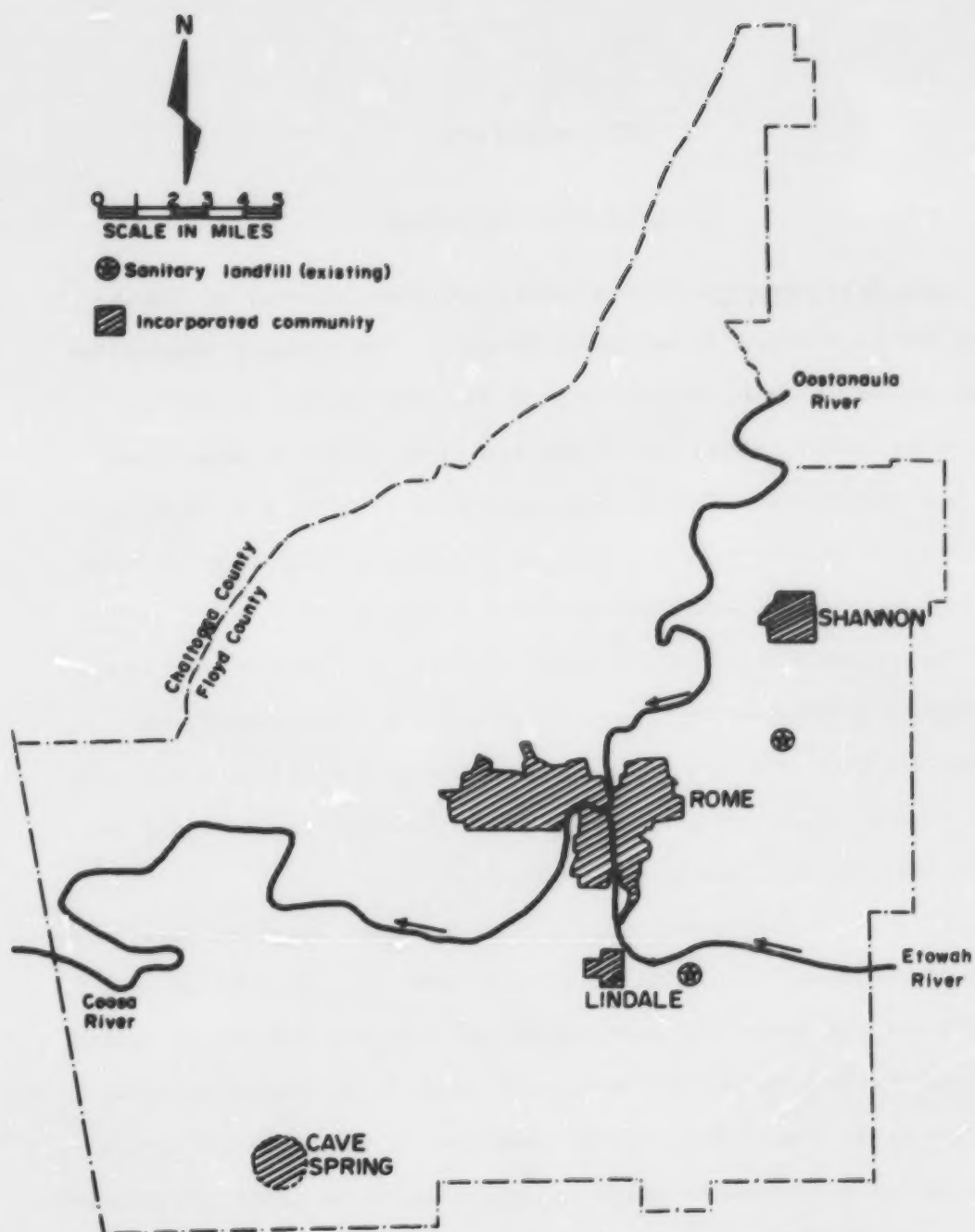


Figure 3. Map of Floyd County, Georgia showing the locations of the two existing sanitary landfills.

SITE SELECTION

Initial Considerations

Land Requirements. Floyd County occupies an area of 514 sq miles and is located in northwest Georgia. The present population is estimated at about 75,000 (Figure 4). The entire county is undergoing rapid industrial growth and along with it, population increase and a rise in commercial activity. The City of Rome is the focal point for this activity in the county, and both the City and the surrounding areas are developing rapidly.

The western Floyd County landfill site is expected to receive all types of solid waste from approximately one-third of Floyd County and also from one-third of the City of Rome (Figure 5). The total annual amount of solid waste to be received is estimated at 31,000 tons, or 150,000 cu yd (Table I).

It is estimated from population projections that the population of the area served by the landfill will grow at a rate of about 1.2 percent per year over the next ten years. Taking industrial growth into account because of the continuing transition from a rural to an urban area, the annual rate of increase in the amount of solid waste delivered to the landfill is estimated to be about 1.5 percent per year (Table II).

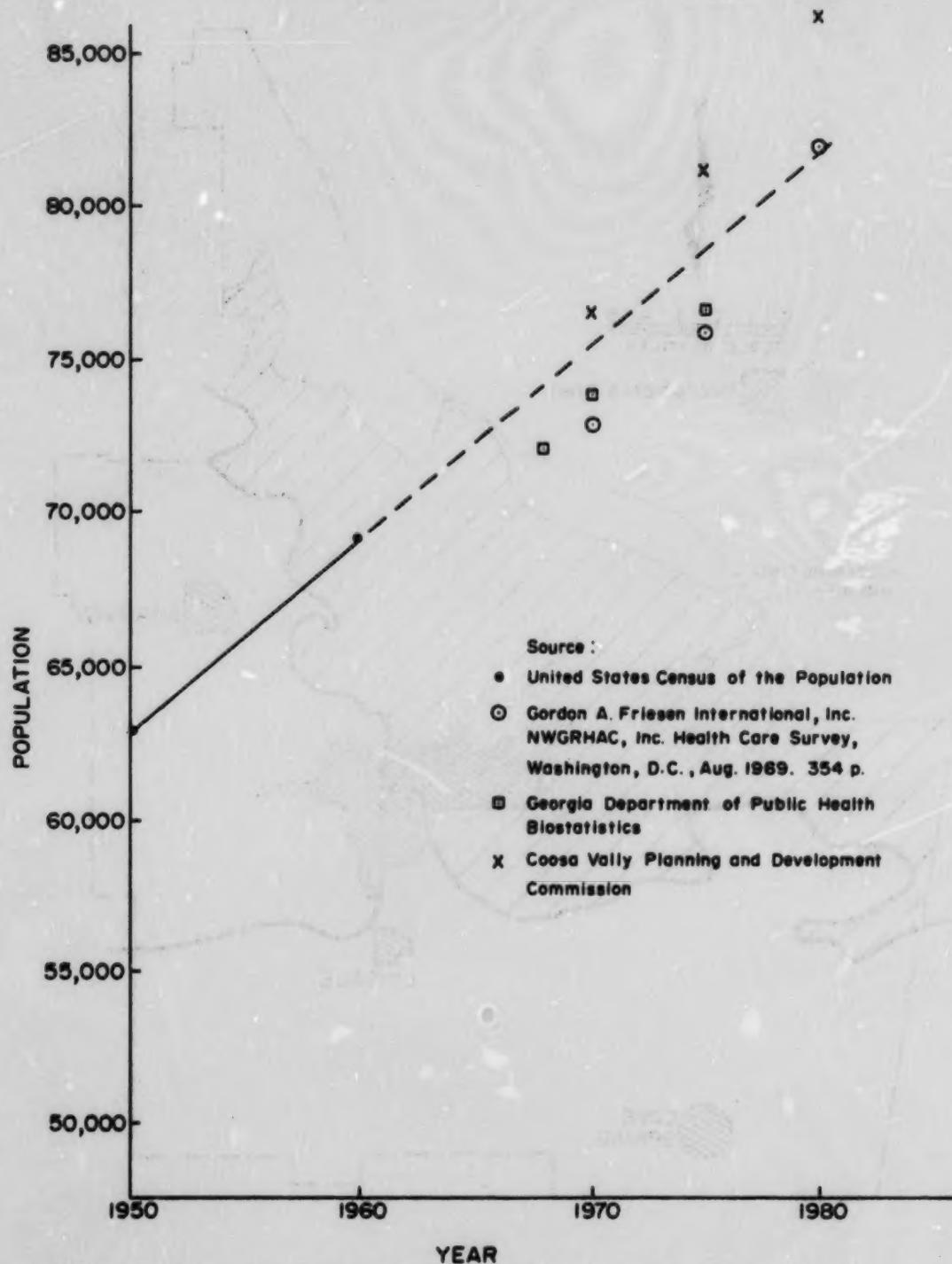


Figure 4. Population projections of Floyd County, Georgia.

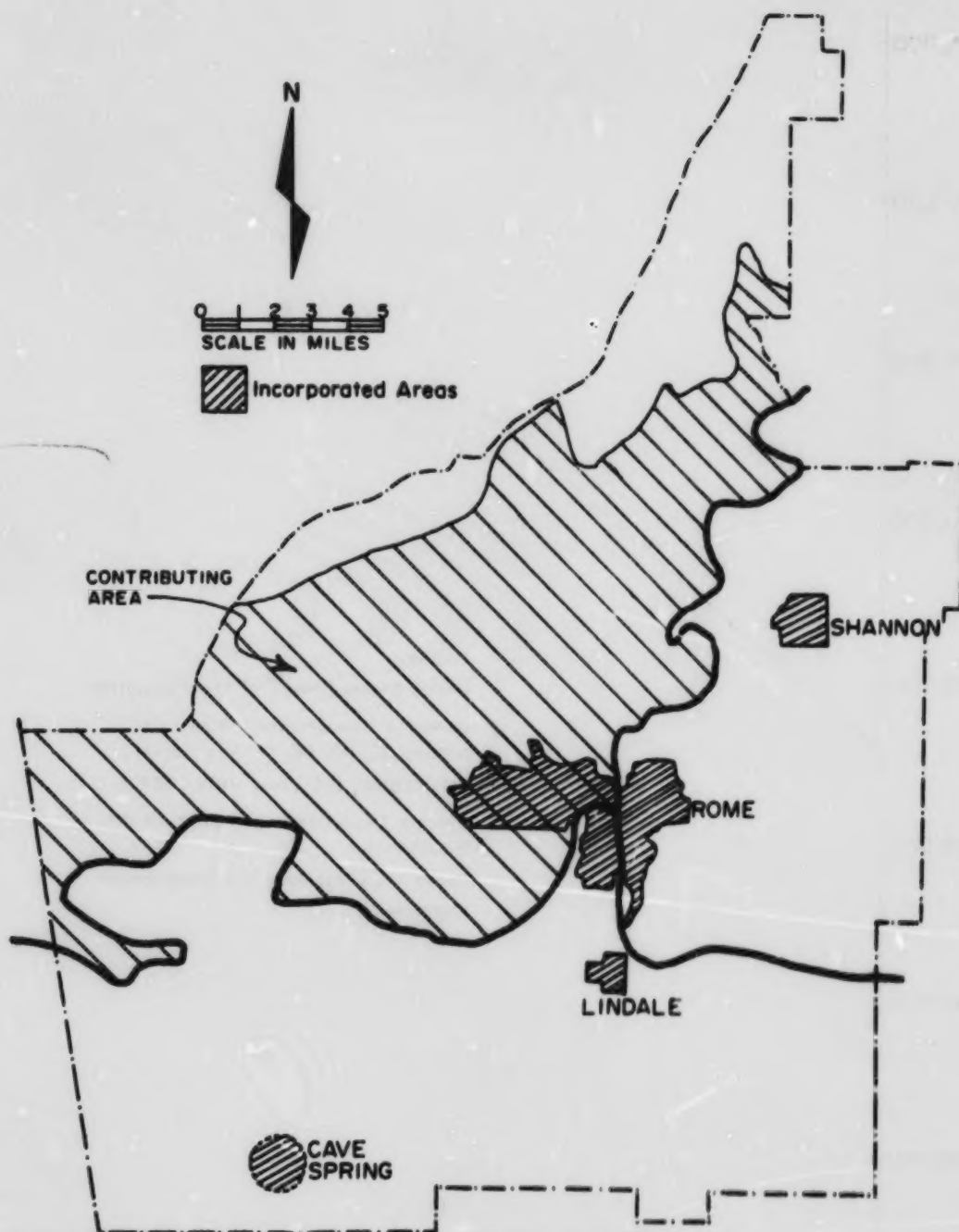


Figure 5. Area expected to contribute to the western Floyd County sanitary landfill.

TABLE I

ESTIMATED QUANTITY OF SOLID WASTE TO BE DELIVERED
TO THE WESTERN FLOYD COUNTY SANITARY LANDFILL, 1970

Type of Waste	Tons	Cubic yards (as delivered)
Residential	16,000	64,000
Commercial	5,000	21,000
Industrial	10,000	65,000
Demolition and construction*	--	--
Other*	--	--
Total	31,000	150,000

*These wastes will not be accepted at this site.

Source: This is the best available estimate and is based on
several sources (Appendix B).

TABLE II

ESTIMATED AMOUNTS OF SOLID WASTE TO BE DELIVERED TO
THE WESTERN FLOYD COUNTY SANITARY LANDFILL, 1970-1980

Year	Tons	Cubic yards (as delivered)
1970	31,000	150,000
1971	31,000	152,000
1972	32,000	155,000
1973	32,000	157,000
1974	33,000	159,000
1975	33,000	162,000
1976	34,000	164,000
1977	34,000	166,000
1978	35,000	169,000
1979	35,000	172,000
1980	36,000	174,000
Total	366,000	1,780,000

Based on annual increase of 1.5 percent.

A rule of thumb that is frequently used when selecting a site for a sanitary landfill is to assume a depth of fill (without cover) of 7 ft. A landfill to this depth will require about 1 acre for every 11,300 cu yd of compacted solid waste. According to Table I, the average density of the material delivered to the landfill is about 410 lb per cu yd. In-place (or compacted) densities of solid waste in sanitary landfills normally ranges between 400 and 1,200 lb per cu yd, depending upon the waste, the compaction equipment used, and the quality of the operation. A value of 800 lb per cu yd will be used for the West Floyd County sanitary landfill. This means that the 150,000 cu yd of waste delivered to the landfill will occupy only about 77,000 cu yd. The area necessary for the landfill operations can be estimated at about 7 acres per year in 1970 and 9 acres per year in 1980 if a 7 ft lift is utilized.

Characteristics of Surrounding Areas. In selecting a site for a sanitary landfill, the use of the land surrounding the site is very important. An acceptable site should be in an area where it is not in conflict with established, or proposed, land uses. It is usually best to locate the landfill away from residential areas in order to minimize complaints from nearby homeowners.

A landfill site must be accessible to collection vehicles. Consideration should be given to the presence of narrow bridges, steep grades, or other factors such as road quality and maintainability that may limit accessibility of the landfill site.

Haul Distance. The maximum distance that solid waste can be hauled economically depends upon the size of the collection vehicles, the size of the crews, and the average speed between the collection area and the landfill. As a general rule, the haul distance should be kept to a minimum.

Cover Material. Cover material should be both readily accessible and suitable for sanitary landfill operations. The best type of soil is a sandy loam having sufficient clay to form a tight cover and enough sand to preclude shrinking and cracking.

The amount of cover material needed varies between three parts and four parts of solid waste for one part of earth (cover material). For a compacted volume of 77,000 cu yd of waste per year, cover material would amount to about 15,400 cu yd (assuming 4:1 ratio).

Geology. Sanitary landfills have the potential of causing ground and surface water pollution if care is not taken in the design and operation of the site to reduce this danger. The groundwater levels throughout the year should be located and filling should be confined far enough above the water table to eliminate the danger of percolation of polluted water from the fill into the groundwater. The height waste is placed above the water table will depend upon both the type of soil and local rainfall conditions.

Climate. The operation of a sanitary landfill is a year-round business. The landfill does not close when the weather is bad. Therefore, local climatic conditions must be evaluated, and provisions

made for operation under all possible conditions. Proper site selection can often minimize operational problems that may arise from flooding of low areas, scouring of steep areas, and inaccessibility of areas with poor soil.

Summary. In summary it can be said that a sanitary landfill site to serve Western Floyd County should have the following characteristics:

1. There should be sufficient land for operation to continue for from five to ten years. For the amounts of solid waste expected, this will require from 40 to 80 acres.
2. The landfill should be located in an area where there will be a minimum number of complaints from nearby property owners.
3. Any landfill site should be either on or near an all-weather road that can adequately carry the estimated volume of traffic using the landfill.
4. The landfill should be located as close as possible to the center of the waste generation area.
5. Cover material should be available either on the site or near enough that its importation would be feasible. The total amount of cover material needed for 10 years of operation will be approximately 154,000 cu yd.
6. The groundwater level should be at a sufficient depth that filling can be conducted to an average depth of at least 6 ft over the entire site.

West Rome Site

Working within the above guidelines, officials of Floyd County and the NWGRHAC investigated a number of potential landfill sites. Several were discarded as being too small, one had poor soil conditions, and several good sites were not made available to the County. Officials of the Berry Schools were contacted during the search for a good landfill site because of their large land holdings in the county. It was in dealings with them that a site was finally located.

The site for the sanitary landfill is located on Berry Hill Road, about 3.5 miles west of the Rome city limits (Figure 6). Rather than purchasing the land outright, it was decided that Floyd County would lease the required area from the Berry Schools in ten acre parcels (Appendix C). When one parcel is filled, its lease would expire and ten additional acres would be available for landfill operation. This arrangement was to the mutual benefit of both the County and the Berry Schools. The County could lease just ten acres at one time rather than leasing land that they would not be using. Berry Schools could leave their commercial timber on all of the land except the ten acres in use at any one time.

Before any design work was begun on the site, all available information on the site was collected. In several cases, published information did not exist, and investigations had to be made.

Land Area. The terms of the lease between Floyd County and the Berry Schools divide the site into six ten-acre parcels, for a total

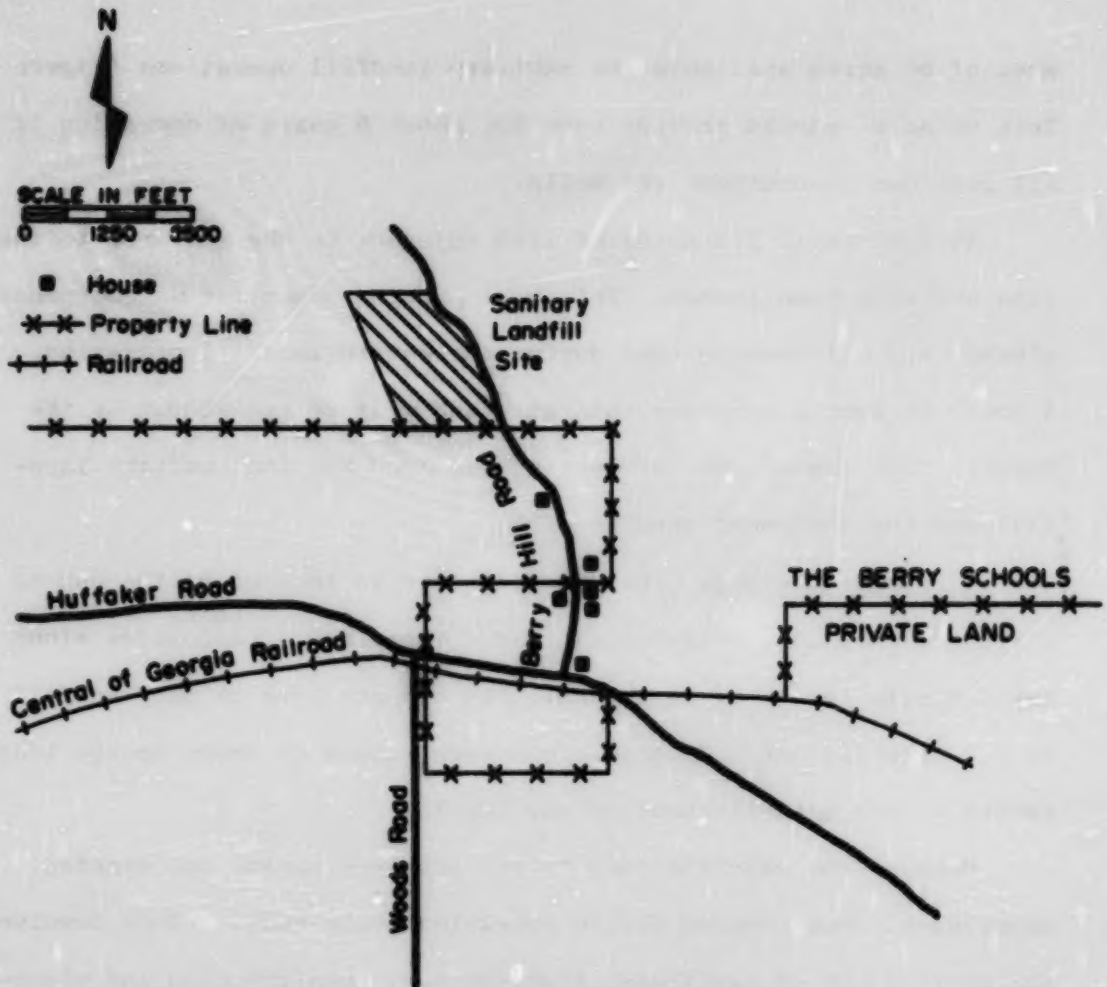


Figure 6. General area of West Rome sanitary landfill.

area of 60 acres available for sanitary landfill operations (Figure 7). This 60 acres should provide room for about 8 years of operation if all previous assumptions are valid.

An additional 1.5 acres of land adjacent to the entrance to the site has also been leased. This will provide space for an equipment storage and maintenance shed during the entire landfill operation. A house presently occupies this site and will be rented out by the County. The annual cost of leasing the land for the sanitary landfill and the equipment shed is \$730.

Surrounding Areas. The landfill site is located at the end of a lightly traveled, residential road. There are 6 residences along the 0.8 mile length of this road. The closest home to the landfill is 0.2 mile distant. No objections were raised by these nearby landowners to the establishment of the landfill.

Because the existing road to the site was narrow and winding, improvements were needed before operation could begin. This involved the acquisition of additional right-of-way, straightening and widening the road, and repaving it with asphalt.

Haul Distance. The landfill is located approximately 9 miles from the center of the western part of the City of Rome. The average driving time from this area to the landfill is about 20 minutes. The average haul distance from within the area served by the landfill is 12 miles, and the average time required for a one-way trip to the landfill is about 20 minutes.

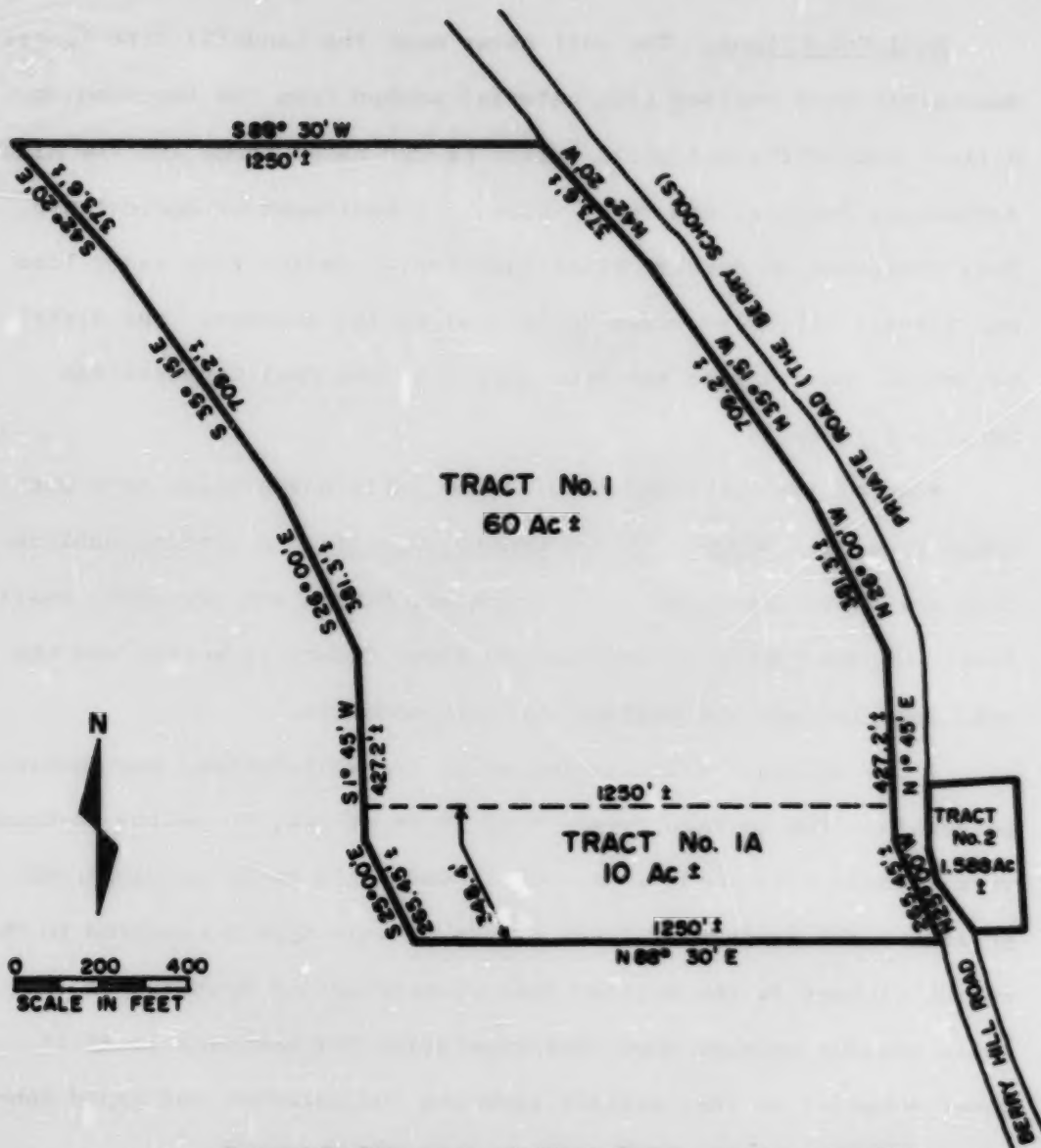


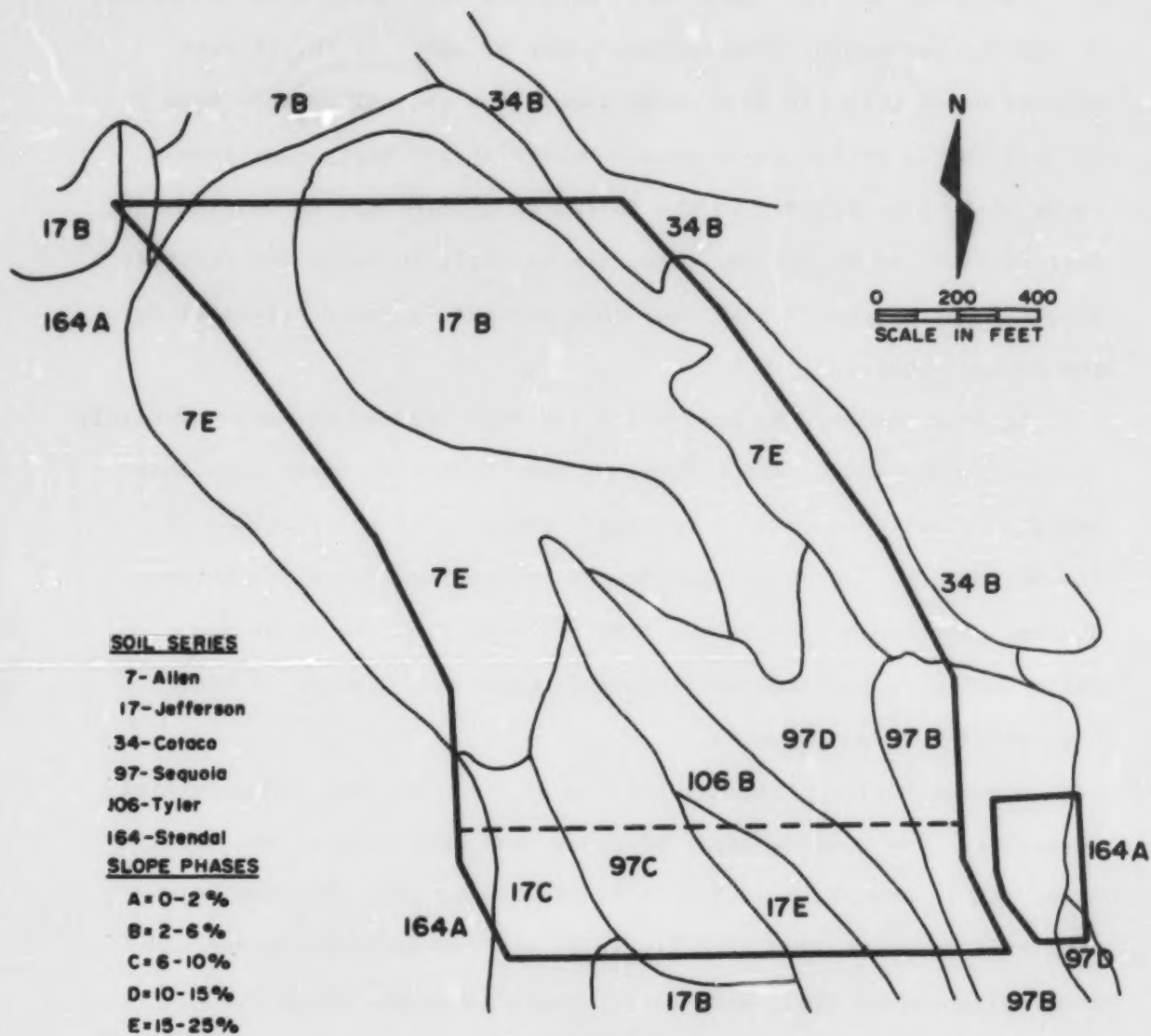
Figure 7. Site map of West Rome sanitary landfill (from lease agreement).

Soil Conditions. The soil cover over the landfill site is predominately loam derived from material washed from the surrounding hills. Four different soils series predominate; these are the Allen, Jefferson, Sequoia, and Tyler series. (Department of Agriculture, Soil Conservation Service classification). Cotaco fine sandy loam and Stendal silt also occur in several of the corners. The distribution of these series has been mapped by the Soil Conservation Service (Figure 8).

Most of the descriptions of these soils given below have been taken from Soil Survey; Gordon County, Georgia. A similar publication for Floyd County is being prepared, but is not presently available. Gordon County is adjacent to Floyd County, however, and the soil descriptions are uniform for both counties.

Allen Series. Allen series soils are well-drained and moderately permeable. The surface layer, 8 to 18 in. thick, is yellowish-brown, very friable fine sandy loam. It is underlain by 20 to 64 in. of yellowish-red sandy clay loam. Soils of this type correspond to ML and CL classes in the Unified Soil Classification System. Allen soils usually possess good characteristics for sanitary landfill cover material as they exhibit moderate infiltration and rapid runoff.

Cataco Series. Cataco soils are similar to the Allen soils which they border.



Source: Soil and Capability Map, Berry School Property, U.S.
Department of Agriculture, Soil Conservation Service.

Figure 8. Soils map of West Rome sanitary landfill site.

Jefferson Series. Jefferson soils are well-drained and moderate to rapidly permeable. The surface layer of about 12 in. is dark grayish-brown gravelly fine sandy loam. The subsoil extends from 2 to 5 ft and is yellowish-brown and yellowish-red silty clay loam. These soils are included in the SM and CL classes of the Unified Soil Classification System. They are normally suitable for sanitary landfill operations in that they have moderately rapid infiltration and medium runoff.

Sequoia Series. Sequoia soils are well-drained and are moderately to slowly permeable. About 6 in. of dark yellowish-brown silt loam overlays a yellowish-red silty clay. These soils are included in the ML, MH, CL, and CH classes of the Unified Soil Classification System. The Sequoia soils are less suitable than the Allen or Jefferson soils for sanitary landfill operations because of their high water-holding capacity.

Stendal Series. Stendal soils are poorly drained and moderately permeable. The surface layer of brown silt loam extends for about 8 in. and is underlain by 3 to 5 ft of mottled grayish-brown silt loam that is stratified with layers of mottled yellowish-brown and light olive-brown fine sandy loam. These soils are classified as ML and CL in the Unified Soil Classification System. Stendal soils have a high moisture holding capacity and are not as well suited to landfilling as Allen, Cataco, and Jefferson soils.

Tyler Series. Tyler soils are poorly drained with moderately slow permeability. A light olive-brown fine sandy loam extends to depths of about 6 in. The subsoils usually extend for about 1 ft and is light olive-brown silty clay loam. These soils are included in the ML and CL classes of the Unified Soil Classification System. Tyler soils are also less suitable for landfill operations than the Allen, Cataco, and Jefferson soils.

The intended future use of this site is the growing of loblolly pine. The Allen, Cataco, Jefferson, and Sequoia soils are most suitable for this purpose and should be used for final cover. This does not present any operational problems because the Stendal and Tyler soils occupy only a small part of the site and are not located so as to be easily used for cover material.

The amount of soil available for use as cover material will be discussed further following an examination of the geology of the site.

Geology. The predominant geological formations in the area are the Mississippian Floyd Shale and the Mississippian Lavender Shale. Information was not available, however, on the depth to rock on the site of the landfill. It was not felt that the underlying strata would be limiting because the Floyd Shale is usually well-weathered and is easily excavated. The Lavender Shale is quite hard, but it usually is found south of the site and is not expected to be a problem.

The soil survey of Floyd County provides a good deal of general information on underlying formations. In the absence of specific data on the site, an examination of these data is useful.

Allen Series. Underlain by shale and cherty limestone at depths from 4 to 7 ft. The seasonally high water table is usually found at depths of more than 15 ft.

Cotaco Series. Same characteristics as the Allen Series.

Jefferson Series. Underlain by shale or limestone at depths from 3 to 7 ft. The seasonally high water table is usually found at depths of more than 15 ft.

Sequoia Series. Underlain by shale or limestone at depth of 4 to 6 ft. The seasonally high water table is usually found at depths of more than 15 ft.

Stendal Series. Underlain by shale or limestone at depth of 5 to 10 ft. The seasonally high water table is at depths of only 1 ft.

Tyler Series. Compact, brittle, and extremely firm silt loam (Fragipan) at depth of 15 to 30 in. Shale at depth of about 5 ft. The seasonally high water table is found at depths of 1 to 2 ft.

An analysis of the amount of soil on the site, based on the minimum expected depth to shale or limestone, reveals that a minimum of about 365,000 cu yd of material will be available for cover material (Table III). The Stendal and Tyler soils, however, will probably not be available as cover because of the possibility of a high water table. The exclusion of these soils would leave 312,200 cu yd of material.

TABLE III

AVAILABLE COVER MATERIAL,
WEST ROME SANITARY LANDFILL

Type of soil	Percent of site covered	Surface area (sq ft)	Minimum expected depth to rock (ft)	Minimum expected volume (cu yd)
Allen	29.4	768,400	4	113,900
Cotaco	1.4	38,600	4	5,400
Jefferson	33.9	886,000	3	98,400
Sequoia	24.4	637,700	4	94,500
Stendal	2.0	52,300	5	9,700
Tyler	8.9	232,600	5	43,100
Total	100.0	2,613,000	-	365,000

Because the information on geologic formations and water was not considered adequate, Floyd County made some limited soil explorations before signing the lease with the Berry Schools. This consisted of excavating four holes with a backhoe to see if rock was encountered or if water would percolate into the pits over a 48 hr period. These holes averaged 8 ft in depth (maximum for the equipment used) and were spaced over the south 10-acre site (Figure 9). Deeper exploration would have been desirable, but the equipment necessary for soil borings to depths greater than 8 ft was not available in Floyd County.

Hole No. 1 exhibited water at 8 ft 6 in. below the ground surface. Water also appeared in hole No. 2 at 7 ft 10 in. below grade. No water was evident in either hole No. 3 or No. 4. These holes were dug in October which is one of the drier months, therefore, the water table would probably be located somewhat higher during periods of heavy rainfall. The relative closeness of the groundwater to the surface in some areas of the site is not expected to produce problems if appropriate care is taken during operation not to excavate in those areas during filling and to secure cover material from the higher ground.

Climate. Climatic records were obtained from the U.S. Environmental Science Services Administration weather station in Floyd County (Table IV). Examination of these data plus recorded extremes does not reveal any conditions that would seriously affect the operation of a sanitary landfill.

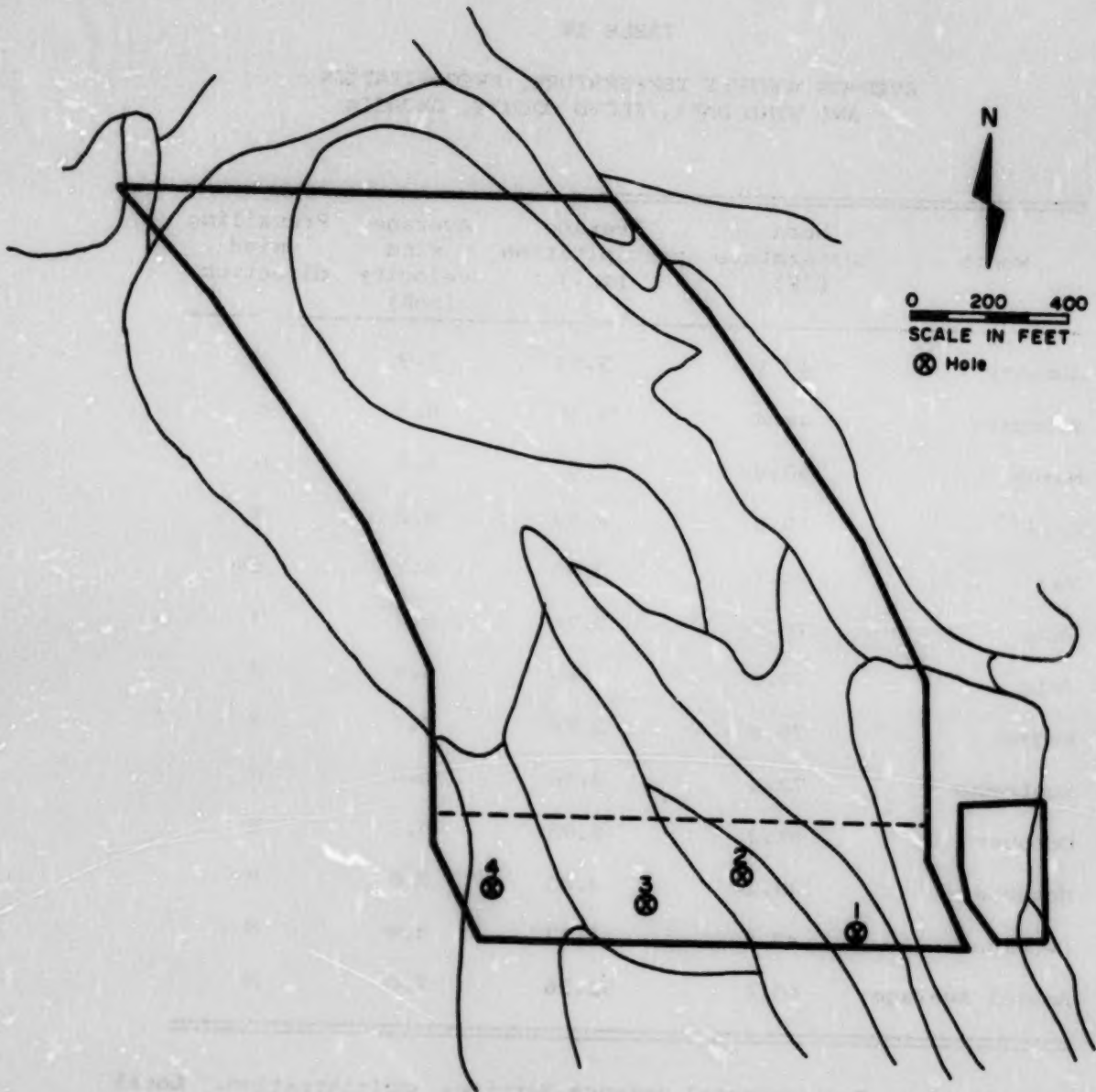


Figure 9. Location of soil exploration holes, West Rome sanitary landfill.

TABLE IV
AVERAGE MONTHLY TEMPERATURE, PRECIPITATION,
AND WIND DATA, FLOYD COUNTY, GEORGIA

Month	Mean temperature (°F)	Average precipitation (in.)	Average wind velocity (mph)	Prevailing wind direction
January	42.1	5.51	7.9	N
February	44.4	5.30	8.3	N
March	50.4	5.87	8.9	N
April	59.8	4.59	8.2	N
May	68.7	3.80	6.7	SW
June	76.4	3.76	6.2	N
July	79.0	4.89	5.9	N
August	78.4	3.76	5.7	N
September	72.4	3.30	6.6	N
October	61.2	2.93	6.1	N
November	49.2	3.42	7.0	N
December	42.4	5.13	6.9	N
Annual Average	60.4	52.26	7.0	N

Source: Environmental Science Services Administration. Local climatological data, annual summary with comparative data, 1968, Rome, Georgia.

DESIGN

General Considerations

Topographic Map. A topographic map of a landfill site should be prepared with contour intervals not exceeding 5 ft. This map should show the existing characteristics of the area and will be used to locate the fill and borrow areas, to locate utilities and facilities, and to design the final contours of the completed landfill. The topographic map is vital to the proper placement of the waste so that the flow of surface water is not impaired.

Site Improvements. Before landfill operations begin the site should be cleared of trees and shrubs. If possible the entire area should not be cleared at one time so that the remaining vegetation can protect the site from wind and erosion.

Any excavation or grading that will be necessary to divert surface water runoff away from the operating area should be done after the clearing is completed.

Roads connecting the landfill site to the existing road system will also need to be constructed. These roads should be suitable for all-weather use so that the collection vehicles always have access to the site. Roads on the site itself will be temporary, reflecting the changes in the operating location, but provisions must be made so that these roads are usable in bad weather. This will usually require the presence at the site of stockpiled gravel or rock that can be used to provide a stable roadbed when necessary.

Utilities and Facilities. The utilities and facilities located at a sanitary landfill serve three main functions: the comfort and protection of the operator, the maintenance and protection of the equipment, and the protection of the environment.

For the protection of the equipment, an enclosed shed or garage is recommended. This should contain the proper tools and equipment for performing the routine preventive maintenance recommended by the equipment manufacturer. In the interest of giving the operator protection from the elements, this building may also contain provisions for a small office and could also be heated during cold weather.

In the event of an accident, or other emergency, some means of communications should be provided at the site. This could either be a telephone or a two-way radio. Toilet facilities should be provided, but usually only a pit privy or a chemical toilet will be necessary. Water will also be needed at the site for fire and dust control and for cleaning of the equipment.

Fencing. Permanent and temporary fences are needed at sanitary landfills. Permanent fencing is used around the perimeter of the site to keep animals and unauthorized persons off the site. Temporary fencing is used for traffic routing and the control of blowing litter. Snow fences located perpendicular to the prevailing winds, and downwind from the area being filled, usually prove adequate for litter control. If, however, they are not sufficient, a taller fence may have to be fabricated.

Plan of Operation. There are three basic methods of operating a sanitary landfill. These are based on the topography of the site, its geology, and the preferences of the designer and operator. All of the techniques have the objectives of sanitary landfilling in common. These are to spread the waste, to compact it into the smallest practical volume, and to cover it with earth at least daily. Each of the methods will be discussed below as quoted from the publication Sanitary Landfill Facts.

Area Method. In the area landfill, the solid wastes are placed on the land; a bulldozer or similar equipment spreads and compacts the wastes; then the wastes are covered with a layer of earth; and finally the earth cover is compacted. The area method is best suited for marshes, flat areas, or gently sloping land and is also used in quarries, ravines, valleys or where other suitable land depressions exist. Normally, the earth cover material is hauled in or obtained from adjacent areas.

Trench Method. In a trench landfill, a trench is cut in the ground and the solid wastes are placed in the trench. The solid wastes are then spread in thin layers, compacted, and covered with earth excavated from the trench. The trench method is best suited for flat or gently sloping land where the water table is not near the ground surface. The advantage is that normally the material excavated from the trench can be used for cover with a minimum of hauling.

Ramp Method. In the ramp or slope method (a variation of the area and trench landfills), the solid wastes are dumped on the side of an existing slope. After spreading the material in thin layers on the slope, the bulldozing equipment compacts it. The cover material, usually obtained just ahead of the working face, is spread on the ramp and compacted. As a method of landfilling, this variation is generally suited to all areas. Having the advantage of utilizing only one piece of equipment to perform all operations makes the ramp or slope method of landfill particularly applicable to smaller operations.

West Rome Sanitary Landfill

Topography. The only existing topographic map of the landfill site was a U.S. Geological Survey map showing 20 ft contours and a scale of 1:24,000. This map was enlarged to obtain a general indication of area topography (Figure 10). It can be seen that the site slopes generally to the southeast from elevations of about 800 ft to about 680 ft. Rain falling on the site will normally flow to the center and out the southeast corner. It will be necessary to keep this fact in mind when placing the waste so that ponding will not occur behind the waste or that a trench will not be dug where it will intercept the runoff.

A 20-ft contour map is not sufficient when designing a sanitary landfill because the variation that exists between contours is too great to be ignored. Therefore, a map was prepared with 2-ft contour intervals (Figure 11) to show this local variation. Only the first 10-acre tract of the 60-acre site has been mapped at this time. Additional maps will be prepared of the total site as it is cleared and put into use as a sanitary landfill.

Site Improvements. The Berry Schools removed the commercial timber from the first 10-acre (tract 1A) before turning the land over to the County. County crews then cleared off the stumps and brush before landfill operations began. Most of the brush was burned and the remaining stumps were placed in a trench and covered.

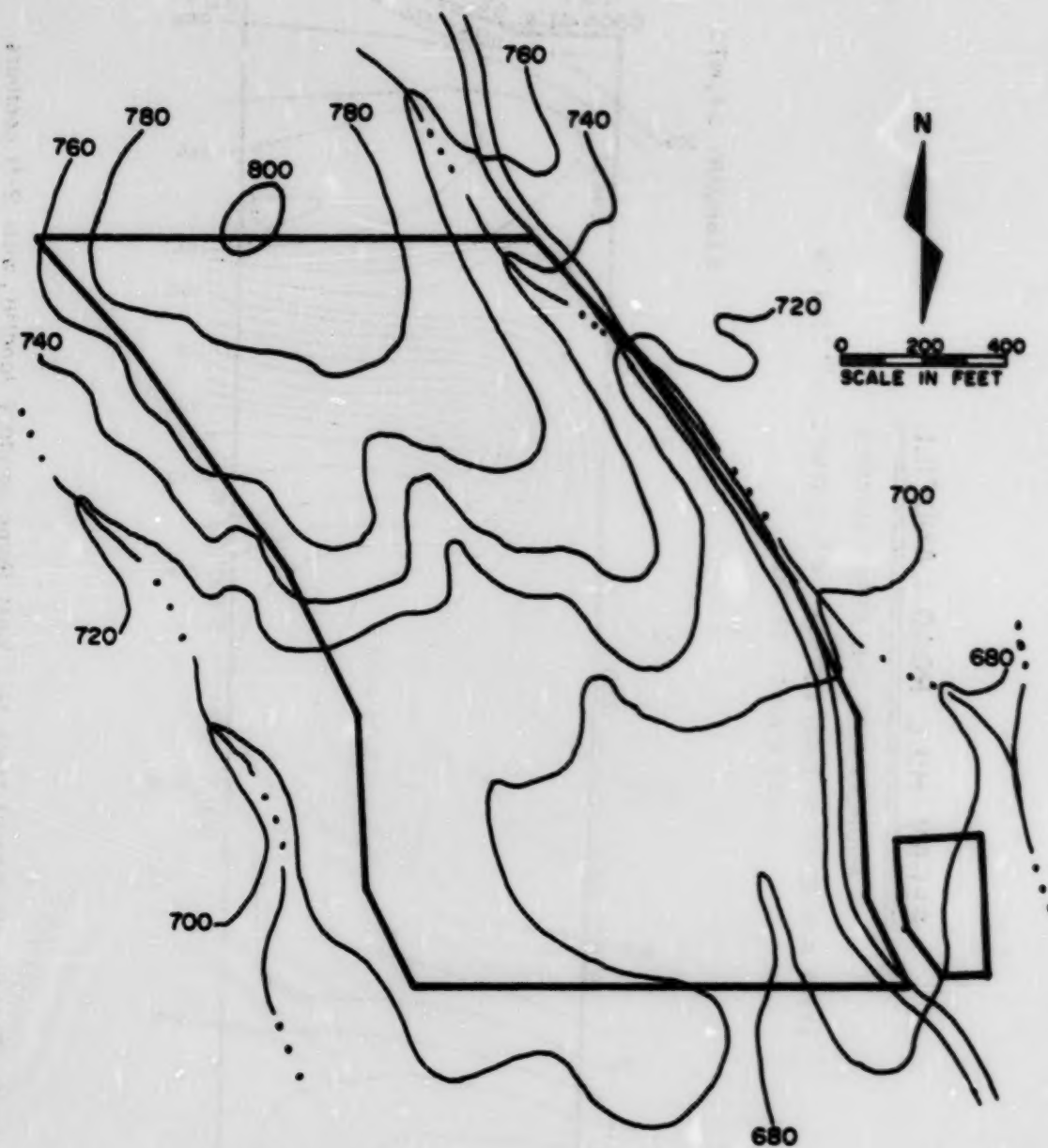


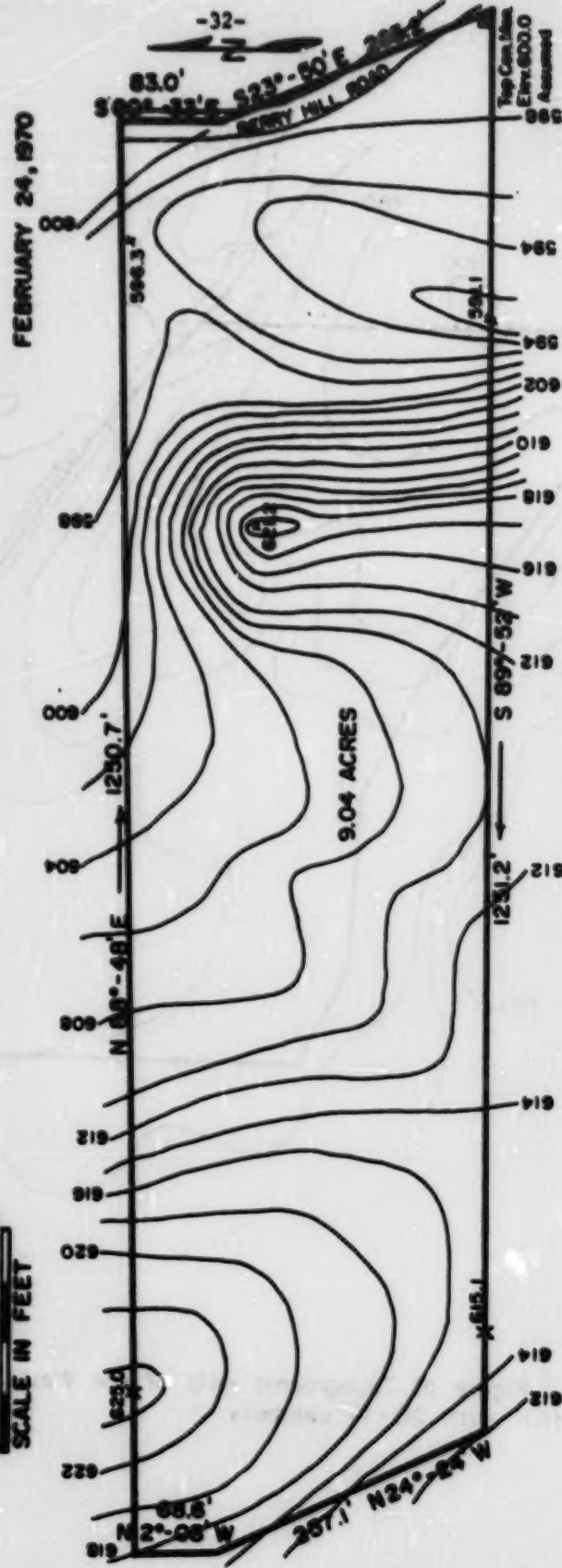
Figure 10. Topographic map of the West Rome sanitary landfill with 20-ft contours.

BERRY HILL ROAD LANDFILL

PROPERTY OF THE BERRY SCHOOLS

LYING AND BEING IN LAND LOT 49, 4th DISTRICT, 4th SECTION
FLOYD COUNTY, GEORGIA

0 100 200
SCALE IN FEET



SURVEY NO. 566

Figure 11. Topographic map of tract 1A, West Rome sanitary landfill, with 2-ft contours.

Utilities and Facilities. A building was constructed at the site to house the landfill equipment and tools and to serve as the caretaker's office (Figure 12, Appendix D). Materials for this shelter were mainly salvaged from buildings being demolished, and labor was provided by County Work Camp inmates.

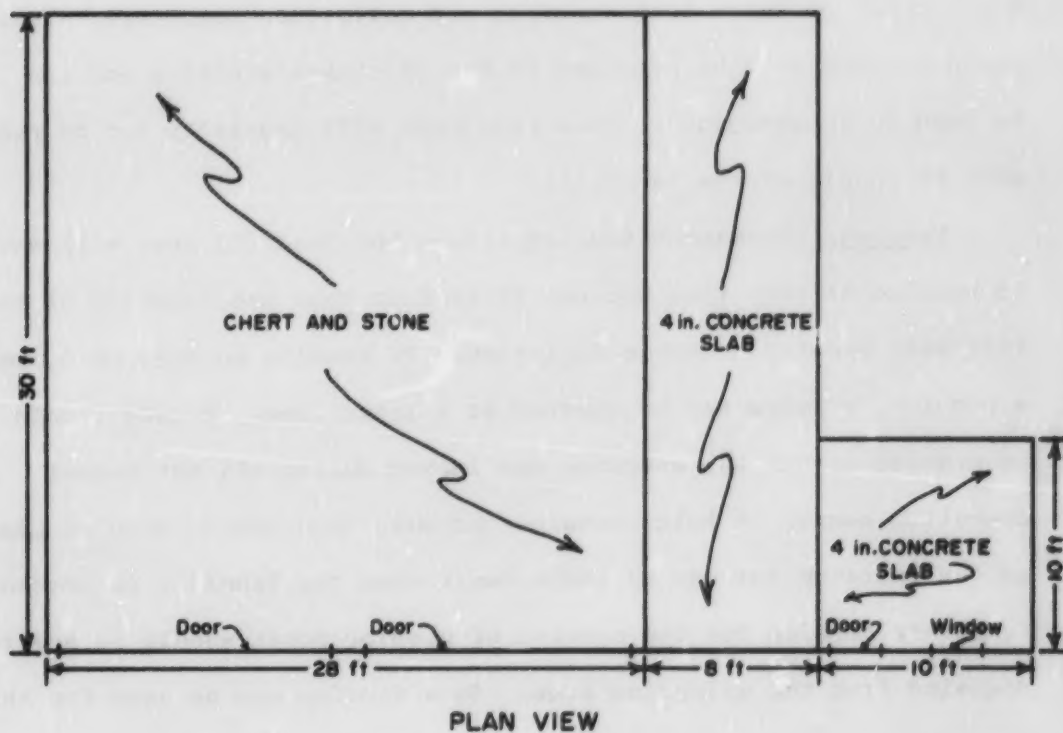
A grease rack was constructed for equipment maintenance (Figure 13). This was in accordance with the contract between the County and the NWGRHAC, Inc.

Water for drinking and equipment washing will be provided from a shallow well located to the south of the rented house. Sanitary facilities will be provided at the landfill by the construction of a pit privy to serve both landfill and collection personnel. Telephone service will be provided to the caretaker's office and can be used in an emergency. This telephone will generally not be available to people at the landfill.

Fencing. Permanent fencing around the landfill area will not be erected at this time because it is felt that the location of the fill will provide suitable isolation. If roaming animals do become a problem, a fence may be erected at a later time. A gate should be erected across the entrance and locked during all but normal operating hours. A bulk container of some type should also be placed at the entrance for use by individuals when the landfill is closed. Temporary fencing for the control of blowing paper should be erected downwind from the unloading area. Snow fencing can be used for this purpose.



FRONT VIEW

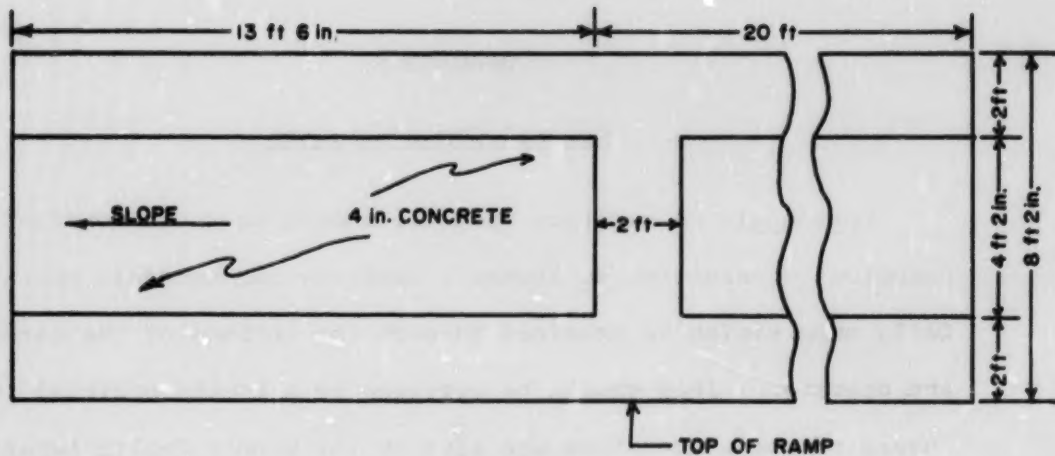


PLAN VIEW

Figure 12. Details of equipment shelter and landfill office.



FRONT VIEW



PLAN VIEW

Figure 13. Details of grease rack for equipment maintenance.

A sign should be located at the entrance to the landfill. It should include such things as the operating agency, the days and times of operation, and any restrictions on use (Figure 14). The sign should be of a size to be easily read and visible from approaching traffic (about 3 ft by 5 ft overall dimensions).

Plan of Operation. Because of the topography of the site, both the area and the trench method of landfill operation will be employed. The area method will be used in those areas that now serve as the runoff channel for rainwater. This will eliminate the need for excavation in those areas and flooding of trenches that would otherwise result. Trenches can be dug along the higher slopes, and should be oriented in an east-west direction so as to be perpendicular to the prevailing winds (Figure 15).

OPERATION

General Considerations

Personnel. A sanitary landfill should be under constant and competent supervision to insure a sanitary and economic operation. Daily supervision is provided through the actions of the caretaker and operator. They should be overseen by a County official to insure economic operation and also by the County Health Department to maintain a sanitary operation. The operator of a landfill as well as all levels of supervision, needs to be adequately trained in its principle of operation.

WEST ROME SANITARY LANDFILL

**Operated by Floyd County
In cooperation with
the Northwest Georgia Regional Health Advisory Council , Inc.**

**Open : 8:00 am - 6:00 pm
Monday through Saturday**

Rules and Regulations:

- (1.) Dump in designated area.**
- (2.) No fires.**
- (3.) No scavenging.**
- (4.) Keep children and pets inside vehicle.**

Figure 14. Suggested format for sign at landfill entrance.

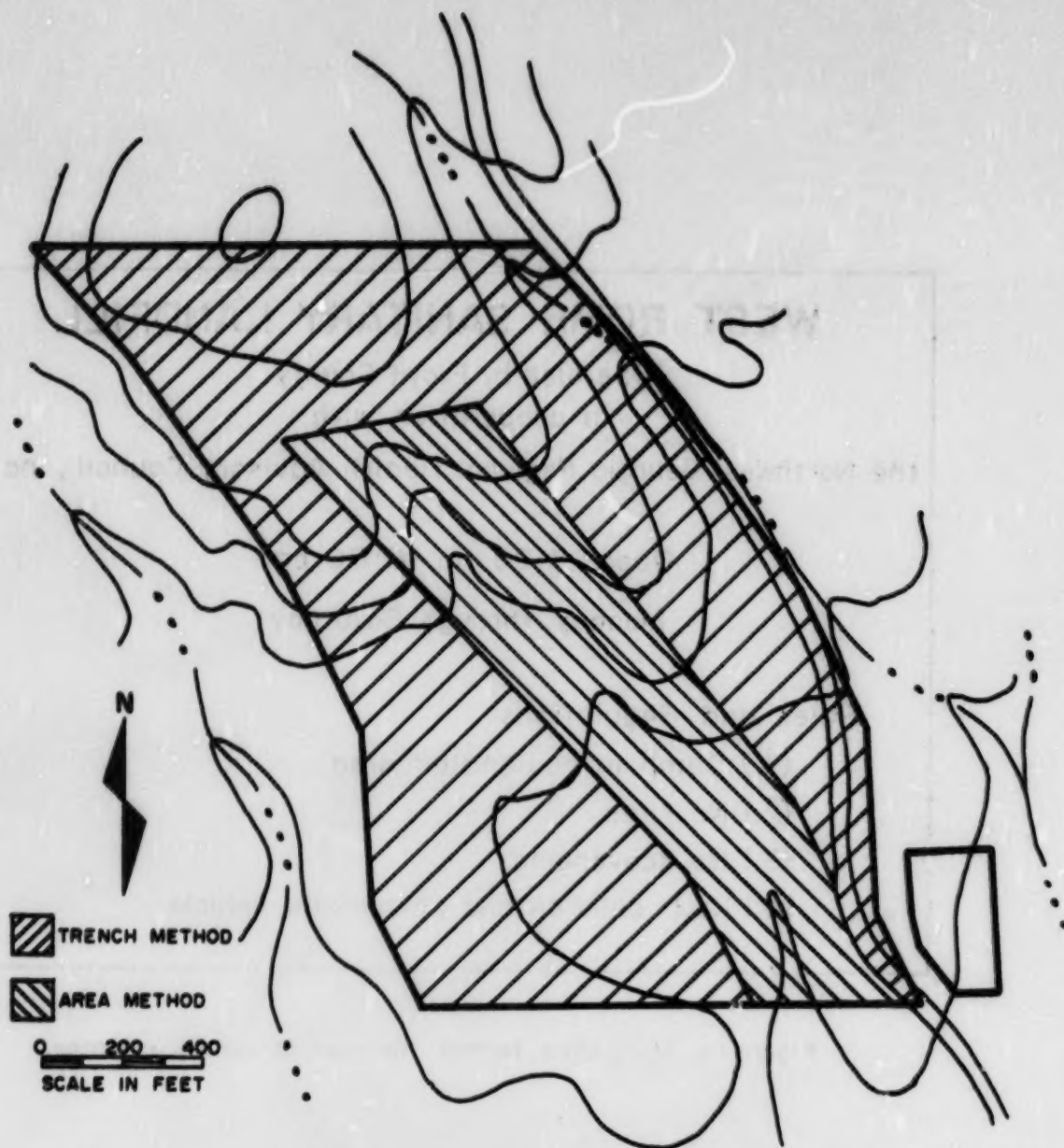


Figure 15. General plan of operation, West Rome sanitary landfill.

Equipment. There are six general types of equipment used on sanitary landfills. These are tracked, wheel, and steel wheel dozers, tracked and wheel loaders, and scrapers. Dozers generally push material, loaders can push but can also lift and carry for longer distances, and scrapers are used to transport cover material from distances of 300 to 1,000 ft. Wheeled equipment is normally more mobile than tracked equipment, but does not have the excavating power of the tracked equipment. Steel wheeled compactors are somewhat specialized types and not as versatile as rubber-tired vehicles.

The special landfill accessory packages marketed by most equipment manufacturers should be investigated and purchased if possible. Sanitary landfill tires which are puncture resistant would also be a good investment if rubber-tired equipment is used.

Operating Procedures. The following operating procedures are quoted from Sanitary Landfill Facts, and should be followed:

Compaction. Solid wastes should be placed at the top or base of the working face, spread in thin layers about 2 feet thick, and compacted. If a slope, or ramp, is used, better compaction will normally result if the wastes are spread and compacted from the base upwards. The degree of compaction is dependent on the character of the solid wastes, the weight and type of compacting equipment, and the number of passes the equipment makes over the material. The actual density of the landfill can be determined from operating records and data. The degree of compaction is a useful tool to determine the rate of space usage, expected life of the landfill, and the overall efficiency of the operation.

Working Face. The size of the working face of the landfill operation is determined by the rate of unloading of the incoming vehicles. The working face should be as narrow as possible to minimize the exposed area, but not so small as to interfere with the unloading operations and the movement of landfill equipment. A minimum width of the working face should be approximately twice the width of the tractor to allow the tractor to move from side to side thus compacting the entire exposed surface.

Depth of Cells. Cell depth is the thickness of the solid wastes layer measured perpendicular to the working slope where the equipment travels. The depth of cells is determined largely by the size of the operation, the elevation desired of the completed fill, the depth of the trench or depression to be filled, and in some cases, the amount of cover material available. Eight feet is generally recommended as a maximum single cell depth because deeper cells usually result in fills that have excessive settlement and surface cracking. However, the cell depth of presently operated sanitary landfills varies from 2 feet to 15 feet or more.

Cover. The compacted solid wastes should be covered at the conclusion of each day's operation, or more frequently if necessary, with a minimum of 6 inches of compacted earth. Because of its workability and compaction characteristics, a sandy loam soil is the most desirable cover material. But if sandy loam is not available on the site, it may be necessary to adjust the covering procedures to the type of cover material available or to haul in more suitable cover material. The cover is necessary to prevent insect and rodent infestation, blowing paper, fires, the attraction of gulls, and the release of gas and odors.

For daily cover, a minimum of 6 inches of compacted sandy loam is recommended. For intermediate cover on lifts which will not have additional lifts placed on them within a year, a minimum of 12 inches of compacted sandy loam is recommended. A minimum of 2 feet compacted sandy loam is recommended for the final cover. The final cover should be placed over the fill as soon as possible to help assure that wind and water erosion does not expose the wastes. Where trees will be planted on the completed fill, a depth of 3 or more feet of compacted earth has been found necessary.

Large Bulky Items. Large bulky items such as car bodies, refrigerators, water heaters, and tree stumps, can be handled routinely with other solid wastes at large landfills that use heavy equipment. At small landfills where light equipment is normally used, special provisions may be necessary to handle bulky items. A separate unloading area at the site or an alternate site, operated in a sanitary manner, should be utilized for the disposal of bulky items that cannot be handled routinely with the other solid wastes.

Wet Weather Operation. Wet weather can seriously hamper the operations of a sanitary landfill by making the soil too soft, mucky, or slippery for equipment operation. Wet weather can also seriously interfere with trenching, covering, and general traffic flow to and from the working face. For these reasons, all-weather access roads and drainage should be built. In many cases, it is advantageous to stockpile such materials as concrete rubble, broken asphalt pavement, stone, etc., for use on the site roads during wet weather. This will minimize the cost of constructing and maintaining hard-surface roads to the unloading area. It is also desirable to provide a temporary wet weather landfill area adjacent to the all-weather road. Such sites are used only during the wet weather periods when the normal working area is not accessible.

Particular attention must be given to landfills when the trench method is being used. If pumping or good drainage is not provided, the trenches will fill with water, resulting in possible ground or surface water pollution and complete shut-down of the operation.

Operating Records. A system of cost accounting and record keeping for sanitary landfills is a necessary part of their operation. Such a system has been designed and is available upon request from the Bureau of Solid Waste Management.

Future Site Uses. The expected future use of the landfill site should be kept in mind during operation so that the necessary grades and elevations can be maintained. It is often helpful to prepare a topographic map of the desired elevations of the completed fill.

West Rome Sanitary Landfill

Personnel. Two fulltime employees will be hired to operate the sanitary landfill. These include an equipment operator and a landfill caretaker. The operator will perform all necessary maintenance on the equipment and will keep the necessary records relating to that maintenance (Appendix E). The caretaker will direct landfill traffic, collect blowing litter, and will keep daily records on operation (Appendix F).

Supervision will be provided over the landfill personnel by the County Manager and his assistants. Officials of the Floyd County Health Department will regularly inspect the site to insure the maintenance of sanitary standards. The NWGRHAC, Inc. will also periodically inspect the equipment and operations, and will provide technical assistance to the County in regard to the landfill operation.

Equipment. The equipment selected for this site, an International TD-15B^{*} was purchased as part of the total equipment bid offered by the NWGRHAC, Inc. It was originally delivered to the County for use at the City of Rome dump where it was used to help close the dump and to establish sanitary landfill operations.

^{*} Mention of commercial products does not imply endorsement by the U.S. Public Health Service.

The TD-15B is a crawler tractor having nominal overall dimensions of 144 in. in length, 108 in. in width, and 86 in. in height. Blade width is about 125 in. The approximate weight with the blade included is about 27,000 lb. Ground contact area is about 3,135 sq in., delivering the weight at an intensity of 8.6 psi.

This tractor, and all of the equipment purchased by the Council, contains several accessories to ensure better operation on a sanitary landfill. These include an enclosed cab for operator comfort, solid side panels on the engine compartment to exclude solid materials, protection of the undercarriage by a belly pan, narrow tracks for limited weight distribution, a sanitary landfill blade (which is wider and higher than a standard blade), and special holes cut into each shoe of the track to allow the drive sprockets to push material through the shoes rather than building up and forcing the tracks off of the sprockets.

Equipment maintenance is an important part of operation and is done in accordance with manufacturer's recommendations and NWGRHAC, Inc. directives (Appendix G).

Operating Procedures. Operating procedures as outlined above should be followed in accordance with the general plan of operation given in Figure 15. County ordinances regulating sanitary landfills must also be followed (Appendix H).

Bulky Waste. Bulky waste will be excluded from this site and will be sent to the City of Rome sanitary landfill. The City site has more space for handling these wastes and will accept all of the bulky waste from within the County.

Wet Weather Operations. It is intended that waste received during periods of wet weather will be placed in the trenches on the west part of tract 1A and on the east side of the other five tracts (Figure 16). Trenches will be dug during periods of good weather and cover material stockpiled. Gravel will be spread if necessary to allow collection vehicles to travel to the disposal area.

Normal Operations. About 150,000 cu yd of waste is expected at the landfill during the first year of operation. This waste would occupy a volume of about 77,000 cu yd in the fill. If most of this waste is received on the six operating days each week, or about 312 days each year, this amounts to 480 cu yd received per day and a utilization of 250 cu yd of landfill volume.

More detailed operating procedures have been developed for tract 1A because of the more detailed topographic map available (Figure 17). Operation is planned in three phases -- I, II, and III. Phase I consists of five trenches oriented in an east-west direction on the western portion of tract 1A. Phase II is an area operation conducted in the low-lying eastern part of the tract. Phase II will be carried out as soon as weather conditions

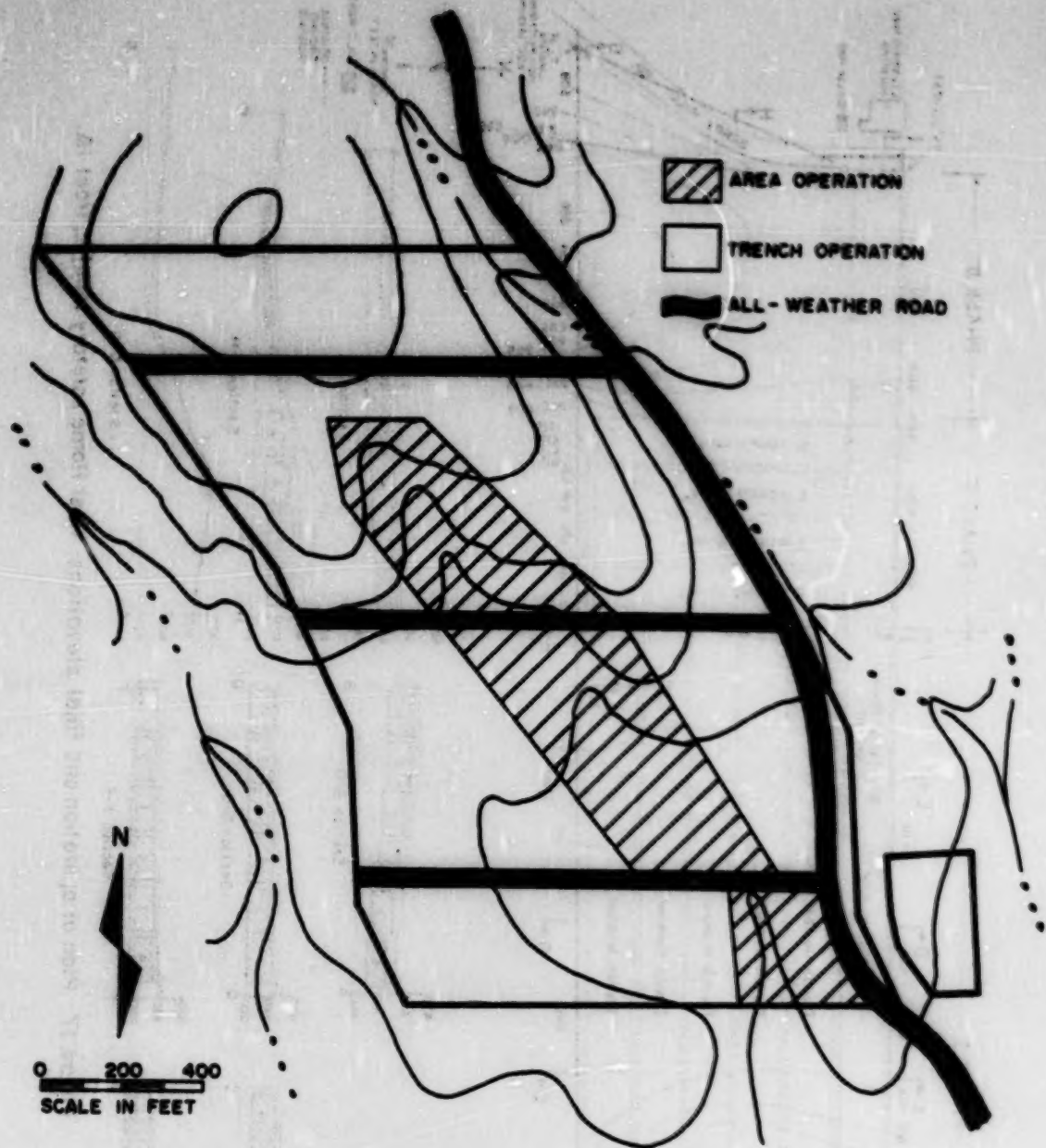


Figure 16. Site utilization and plan of operation,
West Rome sanitary landfill.

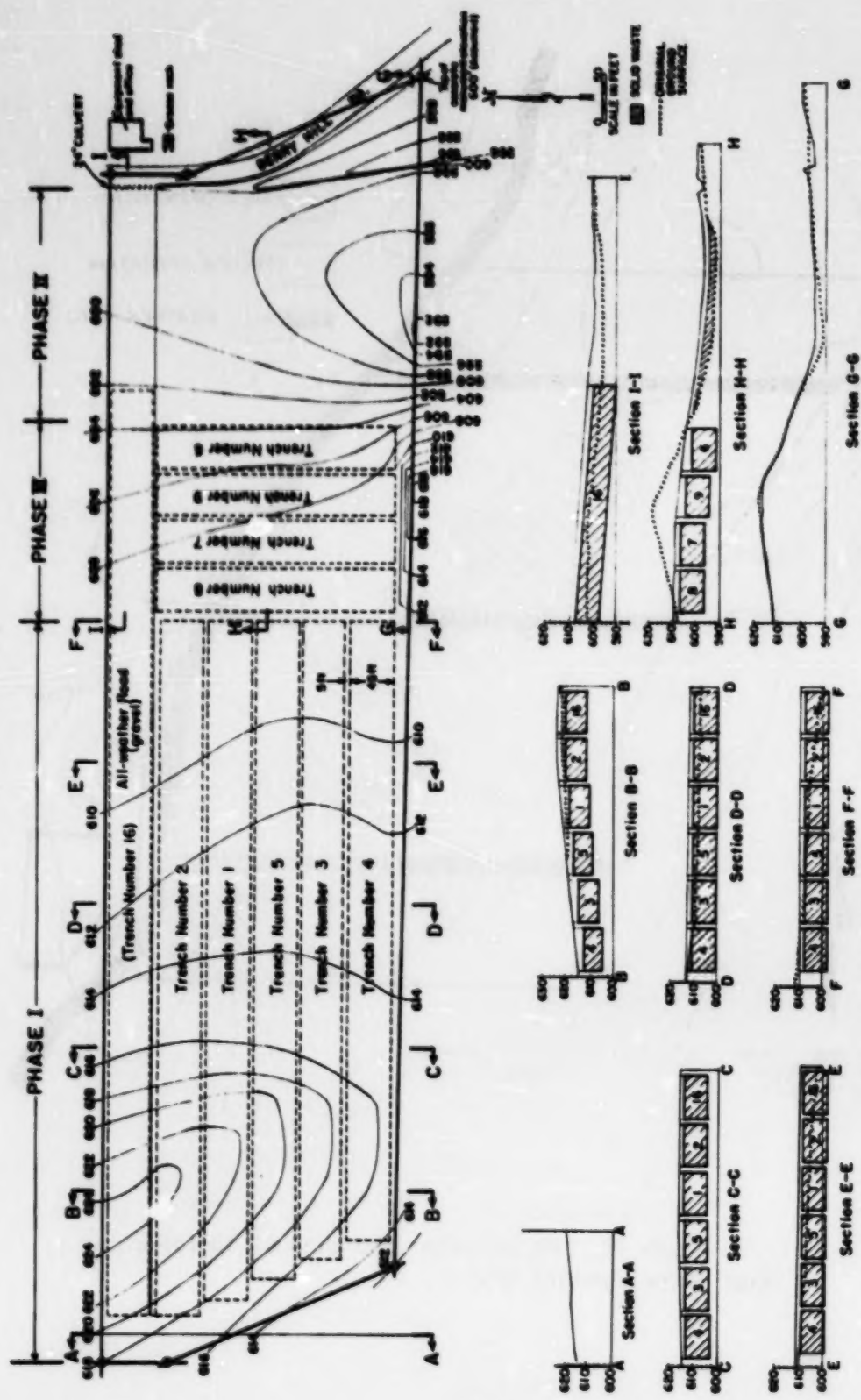


Figure 17. Plan of operation and final elevations, West Rome sanitary landfill, tract 1A.

permit, even if Phase I is not completed. Cover material for this operation will be secured from the raised knoll now occupying the site reserved for phase III operations. After both phases I and II have been completed, four trenches will be excavated in a north-south direction for phase III operations.

Phase I. Five trenches, each 45 ft wide and ranging in length from 650 ft to 750 ft, will be excavated for phase I operations. Trenches will be separated by 5 ft of undisturbed earth to insure adequate wall thickness between adjacent trenches. Trenches will be filled from the west to the east requiring all collection vehicles to travel over previously filled areas. This will result in additional compaction to the waste and cover material.

A single trench will be excavated to the desired grade and filling will begin. As the trench is filled, the next trench will be dug. Arrangements have been made with the City of Rome to provide a dozer and scraper one day each week to prepare subsequent trenches. Cover material will be obtained from the bottom of the trench ahead of the slope or from the stockpiled material placed where trench no. 5 will eventually be dug.

Daily cover will be 6 in. of compacted soil. Additional material will be placed on the top of the fill as needed to maintain cover and to provide a firm roadway for collection vehicles. Final cover will consist of 24 in. of compacted earth placed on top of completed trenches during the excavation of subsequent trenches.

Phase II. Phase II operation will be an area fill in the low area on the east side of tract 1A. Filling will progress from the north toward the south and will be to a height so as not to impede natural drainage (Figure 17).

Cover material will be obtained from the knoll just west of the area and will be applied to the same depths as in phase I operations.

Phase II should be carried out as soon as the area to be filled is dry enough to be worked. It is anticipated that the drain installed to by-pass this area and the warmer weather of spring would allow work in this area either prior to, or early in the summer months. During phase II operations, phase I will be suspended except during periods of inclement weather that may interfere with area fill operations.

Phase III. Phase III operations will consist of four trenches dug in a north-south direction between the areas filled in phases I and II. Trenches will be 45 ft wide and 250 ft long. There will be 5 ft of undisturbed earth left between trenches.

Filling will progress from the north toward the south and compacted waste will be covered with 6 in. of compacted soil at the close of each day's operation. Two ft of final cover will be applied after the four trenches have been completely filled.

The road along the north boundary of tract 1A will also be utilized during the filling of tract 1B. At the end of operations in tract 1B, the road material will be removed for use in constructing a new road between tracts 1C and 1D. A trench, 45 ft wide, will then be excavated under the former roadway and will be filled before operations begin in tract 1C.

Operating Records. The NWGRHAC, Inc. requires that certain records be kept by the landfill caretaker and operator. These include a daily work sheet on which the caretaker keeps an account of the material received (Figure 18). This sheet is for the caretaker's records and is retained by him. A daily service report is also kept by the NWGRHAC, Inc. to record any outside repair work done on the equipment (Figure 19).

Daily records, including maintenance, are tabulated from the work sheets onto a monthly time and cost record (Figure 20). These monthly records are submitted to the NWGRHAC, Inc. for approval and checking.

Future Site Uses. It is planned that after the completion of landfill operations on each of the 10-acre tracts they will again be planted with loblolly pine trees. Final ground elevation after operation will not be too critical because of this intended use. Steep slopes should be avoided so as not to cause erosion problems, but some slope must be allowed to prevent ponding of rainwater.

DAILY WORK SHEET
(Caretaker or Operator)

Date _____ 19__

[illegible]

Figure 18. Daily work sheet.

TIME AND COST RECORD

Site No. _____ Machine No. _____

(County)

For the Month of _____ 19__

DATE	Fuel Oil			Lubricating Oil			Repairs			Maintenance Cost			Operator			Type of Refuse			Total Cost
	Actual	Estimated	Used	Actual	Estimated	Used	Actual	Estimated	Used	Actual	Estimated	Used	Actual	Estimated	Used	Actual	Estimated	Used	
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On packer and large open body trucks or any other that make regular trips, it would be better to estimate the capacity of the truck and divide the volume. Example: On a 20 cubic yard capacity packer truck with 1 1/2 load would be 10 yards of refuse; or an open truck with a 10 cubic yard capacity would be 10 yards of refuse. A small baggage trailer may hold 1 - 1 1/2 yards of refuse; refuse brought out in grocery sacks in the back of a car would be given a "under Total Cubic Yards" and no volume given.

Same as listed above under household.

Same as listed above under household.

Same as listed above under household.

Same as listed above under household.

This would be the sum total that was brought to the sanitary landfill by ALL vehicles during each day.

At end of month, total the large sheet and place totals on monthly total sheet.

Commercial

Number of Trucks

Total Cu. Yds.

Industrial

Number of Trucks

Total Cu. Yds.

Refuse Total Cu. Yds.

Monthly Total - Sanitary Landfill Time & Cost Record

Service meter readings to be recorded at end of day.

Record time in minutes or fractions of hour spent inspecting and cleaning underside of tractor.

Give number of hours actually worked on the tractor in cleaning, inspecting, and preparing of site for future operations.

Give time (number of hours) working on other than the sanitary landfill; example: working on roadside clean-up equipment servicing, cleaning, etc.

Give number of hours actually worked on the tractor in cleaning, inspecting, and preparing of site for future operations.

Give time (number of hours) working on other than the sanitary landfill; example: inspection of roadside dumping, cleaning roadside dumps, answering complaints about roadside dumps and improper disposal of refuse, if assigned, time spent on tasks to schools, civic clubs, etc.

Divide into the following classifications:

Refuse

Household

Number of Trucks

Site number as assigned.

Fill in at end of day with estimate of hours tractor worked.

Number of quarts either added or put in tractor when oil is changed. (Cost of oil to be filled in by county office).

Estimate of pounds used. (Cost of grease to be filled in by county office).

Number of quarts added. (Cost of hydraulic oil to be filled in by county office).

Number and type used when replaced. (Costs of filters to be filled in by county office).

Items that cost money and not carried under any other heading on this sheet should be placed in this column with any details or explanation to be placed on back of sheet. Examples are: fuel oil (galons), grease (pounds), oil (pounds), etc. Items that require expenditure of funds, county shop or outside mechanics, any other items that require expenditure of funds.

Give part number here and explanation on back of sheet. (Costs of parts to be filled in by county office).

Give hours or job unit with explanation on back of sheet. (Costs of labor to be filled in by county office).

Figure 20. Monthly time and cost record.

ACKNOWLEDGMENTS

The information contained in this report was collected with the help of many people. Thanks must be given to Mr. Joseph W. Hunt, Director of Environmental Sanitation, NWGRHAC, Inc., Mr. Charles M. Kelly, Field Service Representative, NWGRHAC, Inc., and Mrs. Elizabeth Stewart, Secretary to the Director of Environmental Sanitation, NWGRHAC, Inc.

Floyd County officials contacted included Mr. Colquitt Hall, County Manager and Mr. Jack Eaves, Assistant County Manager, Mr. Paul Smith, County Agent, and Mr. James Wyatt, special consultant on industrial development.

Mr. Daniel Norton of the Soil Conservation Service, Mrs. Juanita Lester of the Environmental Science Services Administration, and Mr. Charles Cressler of the Geological Survey provided much helpful information, as did Mr. John Bennet of the Coosa Valley Planning and Development Commission.

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APPENDICES

APPENDIX A

**STANDARD SANITARY LANDFILL CONTRACT BETWEEN THE
NORTHWEST GEORGIA REGIONAL HEALTH ADVISORY
COUNCIL, INC. AND THE COUNTIES IN THEIR REGION**

GEORGIA, _____ COUNTY:

**THIS AGREEMENT, made and entered into, this 2nd day of
January, 1969, by and between _____ COUNTY,
a Political Subdivision of the State of Georgia, hereinafter
referred to as CONTRACTOR and the NORTHWEST GEORGIA REGIONAL
HEALTH ADVISORY COUNCIL, INC., a Georgia Corporation, herein-
after referred to as COUNCIL:**

W I T N E S S E T H

**THAT WHEREAS, the Council, having been approved for an
Appalachian Demonstration Health Grant # AG-10404-01-68, to
encourage and participate in the establishment of sanitary land
fill operations for the disposal of solid waste products in the
area encompassed by said Council, and**

**WHEREAS, said Council desires to encourage the establishment
of sanitary landfill operations, within said area,**

**NOW THEREFORE, IN CONSIDERATION of the mutual covenants and
agreements herein contained and other valuable consideration in
hand paid, by each party, to the other, the receipt and sufficiency
of which is hereby acknowledged, by the parties hereto, and pursuant**

to the properly adopted and drawn Resolutions of the Governmental Agencies involved and the Council, it is hereby mutually agreed as follows:

-1-

The Contractor shall at it's expense, provide a site or sites to be used for landfill operation. The number, location and suitability of said sites shall be mutually agreed upon by the parties, and present sites may be used provided they meet or are brought up to the standards provided herein.

-2-

The Contractor shall use said site or sites for the disposal of all garbage, ashes, tin cans, bottles and other types of residential and commercial rubbish and refuse brought to the site by the Contractor, or by any Citizen or Resident or other persons lawfully transporting and handling said waste.

-3-

The Contractor shall not be required to accept for disposal, any toxic or highly volatile materials. The Contractor shall have the exclusive right to operate said site and have complete jurisdiction of same. The Contractor may designate the location on the site, at which materials are to be unloaded and shall make reasonable rules and regulations governing the operation of said site as are in conformity with the standards and conditions of this contract.

-4-

Authorized Personnel of the (1) Council, (2) The Appalachian Regional Commission, and (3) Department of Health, Education and Welfare may make inspections of said landfill operation at any time that the land fill is open for business.

-5-

The Contractor, as aforesaid, shall have exclusive right to operate and accept full responsibility for the operation of said site, for the term of this agreement, or any extension thereof, subject to the following terms and provisions:

(a) The Contractor shall furnish all labor, materials and power for the operation of said landfill site and shall operate the same according to accepted modern standards of a sanitary landfill operation, recommended by the Council and under the supervision of a qualified engineer assigned by the Council, to assist in the location and operation of said landfills, so that the same shall not become a nuisance or offense in the area.

(b) All waste accepted by the Contractor shall be thoroughly compacted by equipment of sufficient weight and capacity to carry out said operation.

(c) Mixed solid waste material shall be spread out on the working face of the landfill so that the depth does not exceed a maximum depth of two (2) feet prior to compaction.

(d) The area shall be kept neat and in a sanitary condition at all times, and shall be covered with earth or some other inert material at the end of each day's operation as hereinafter set out in sufficient depth to prevent blowing papers and unsightly condition. The size of the active face on which refuse is being currently deposited shall be kept at a minimum, consistent with an efficient and proper operation.

(e) Cover material will consist of loam, clay, sand, or other acceptable inert materials, such as ashes, cinders or gravel. A minimum depth of six (6) inches of compacted cover and final spread cover material is recommended and shall be kept on all inactive faces of the land fill at all times. The active faces of the landfill shall be covered at the end of each day's operation, with at least six (6) inches of compacted cover material which shall exclude fly ash or other dusty material.

(f) When the fill has been brought up to twenty four (24) inches below the desired finished grade, it shall be covered with at least twenty-four (24) inches of compacted cover material graded and seeded in such a manner as to prevent erosion.

(g) The Contractor shall erect such temporary and permanent fences or take other measures as may be necessary to reasonably control the blowing of paper and other material from the landfill.

(h) Burning of any material deposited in the landfill will be prohibited.

(i) The Contractor shall provide an access road to and within the landfill sites which shall be kept passable in all types of weather and at all times of the year.

(j) The Contractor shall provide at the landfill site, as operating expense, such structures as may be necessary and required for the protection of the equipment and office use.

(k) The Contractor shall provide water under pressure for washing and servicing equipment and for extinguishing fires in the landfill.

(l) The Contractor agrees to open the site at times convenient for local use and efficient operation.

(m) The Contractor shall assist the Council in planning for more efficient use of the landfill, developing collecting systems and other programs related to the improvement of solid waste operation by keeping daily records of maintenance, unkeep and use of the equipment, and by keeping daily records of landfill utilization.

(n) No salvage operations shall be permitted at any landfill site.

Conditions unfavorable for the production of insects and rodents shall be maintained by carrying out routine landfill operations promptly in a systematic manner. Supplemental vector control measures shall be instituted whenever necessary.

(a) The Council shall pay to Contractor up to the sum of \$ _____ as reimbursement for services performed in the establishment of and operation of said landfill site or sites and other operating expenses hereunder for the first year of the grant period. Said payment shall be paid upon satisfactory fulfillment of this contract. During the second year of the grant period payments shall be made quarterly. The exact amount will be determined upon re-negotiation of the contract.

(b) Thereafter, for the last three years of the grant term, should this contract be continued, reimbursement for services performed and other qualifying expenses shall be up to one half of the total operating costs. At no time shall the Council's participation be greater than difference between the total cost and total income.

(c) The number and qualifications of the tractor operators and caretakers employed hereunder shall receive prior approval by the Council, or its designated project supervisor, in its behalf.

The Council through it's professional engineer, shall determine the type of equipment needed at said sites, and shall purchase the same, paying eighty (80%) per cent of the costs of said equipment, with the Contractor paying the balance. In the event the

Contractor desires larger or more powerful equipment, said Contractor, with the consent of the Council may have the Council purchase the same, but shall pay the difference in the cost of said equipment, above the eighty (80%) per cent cost of the recommended equipment.

-9-

The Contractor shall use the equipment purchased under this Contract, for solid waste disposal, on the agreed site, and for no other purpose, without Council approval, for the term of this Contract.

-10-

The Contractor agrees to maintain any pre-existing level, of financial effort in solid waste disposal and funds granted in this contract will be for improved as well as for new or expanded services.

-11-

The initial term of this agreement shall be for the first year of the five year grant, beginning the 1st day of November, 1968, and ending on the 31st day of October, 1969. Said initial term of this agreement shall automatically be extended for successive additional one year terms, unless either party notifies the other in writing not less than sixty (60) days prior to the expiration of the initial term, or any extension thereof, of its intention to terminate this agreement, said written notice shall be sent by

Certified or Registered Mail, return receipt requested, to the address of said parties. In the event the Federal Grant funds are terminated for any reason, then this contract shall be terminated instantly upon notification to the Contractor by Registered Mail.

-12-

Title to the said equipment herein shall remain in the Council for and during the useful life of said equipment, and should this contract be terminated by the Council, prior to its expiration for failure of the Contractor to comply with any of the terms herewith, said equipment shall be surrendered immediately to said Council.

(a) Should Federal funds be terminated and not available for continuation of said grant during the life of this Contract or any subsequent extension thereof, or during the useful life of the equipment being utilized hereunder, the Contractor must continue to use said equipment in the same manner and for the same purposes, to-wit: sanitary landfill operations, without financial assistance from the Council.

(b) If for any reason the Council should be dissolved, or cease to exist, the Contractors shall have the right, individually or collectively, to seek grants to continue said operations, and the Council, shall, before said dissolution, assist and co-operate with those Contractors desiring to continue by requesting project revisions to permit continuation of said program under such terms and conditions as permitted by the proper agencies.

(c) If said Contract is terminated for any of the above reasons, or any others, or if said Contractors do not continue with said project, all equipment shall be surrendered to the Council for disposition and/or subsequent credit to the then value of the Federal Share to the Grant Account (if still open) or to the Federal Treasury.

(d) The said applicable equipment may, with prior approval of the Department of Health, Education and Welfare and the Appalachian Regional Commission, or any appropriate successor Agency, be turned over to an organization performing health or health related activities with suitable reimbursement for the then value of the contractor's share.

(e) The Contractor shall be reimbursed its proportionate share of its participation in said equipment, or may have the option upon Council approval and the appropriate Federal Agencies, of satisfying the then value of the Federal Share and acquiring unencumbered title.

(f) Only counties who maintain a current membership in good standing with the Council shall participate hereunder and any County which defaults on its obligations to the Council shall upon notice from the Council surrender equipment obtained under this grant to the authorized representatives of the Council at the time and place designated in said notice.

(a) The Contractor agrees to comply with all laws, ordinances, and regulations applicable to the operation of sanitary landfills,

and agrees that all services rendered by it hereunder, shall be rendered in a clean, sanitary, neat, courteous and efficient manner.

(b) Said Contractors shall also certify each year on forms to be furnished by the Council, the location of, use for intended purposes, serviceability of said equipment and such other information as is pertinent for accountability purposes.

-14-

The Contractor further agrees that as a Political Subdivision, it will adopt said Ordinances, Rules and Regulation as are within its power to carry out and effectuate the terms of this Contract.

-15-

In the event that the Contractor shall wholly fail to dispose of garbage and other materials herein provided for a period in excess of five (5) days, and said failure is due to the fault of the Contractor and not due to war, insurrection, riot, strike, Act of God, or other cause beyond the Contractor's control, the Council, at its option, may, after written notice to the Contractor, take over any and all of the equipment purchased with grant funds.

-16-

In the event that any issues arising out of the Council's taking over the equipment, as provided above, cannot be resolved by the parties hereto such issues shall be resolved by arbitration, each party selecting an arbitrator, and the two arbitrators selecting

a third arbitrator and a majority vote of the said three arbitrators shall be conclusive and binding upon both the Council and Contractor. The cost of arbitration shall be borne equally between the parties.

To insure that the detailed specifications, regulation and laws for the operation of a sanitary landfill are complied with, the landfill site and operation shall be rated monthly during the term of this agreement by qualified representatives of the Council and the Contractor shall be responsible for maintaining a satisfactorily rated landfill in accordance with the terms of this contract, its location and the applicable statutes, governing same, and in accordance with its resolution and ordinances or regulations adopted for the operation of same.

The Contractor agrees as a condition of this grant to comply with the applicable Public Health Service grant information and policies pertinent to this program. The contractor further agrees to comply with Title VI of the Civil Rights Acts of 1964 (P.L. 88-352 and the regulations issued pursuant thereto).

- 66 -

-19-

If any provision of this agreement shall be declared illegal, void or unforceable, it shall not affect any other provisions of this contract.

-20-

A part of Contractor's operating costs during the latter three year period of the grant term, shall be the Regional Council's cost of administration of the program proportioned among the participating contractors.

IN WITNESS WHEREOF, the Parties hereto have signed and executed this agreement, and affixed their seals thereto, in duplicate, on the day and year above first written.

CITY OR COUNTY OF

ATTEST:

BY _____

Secretary

NORTHWEST GEORGIA REGIONAL HEALTH
ADVISORY COUNCIL, INC.

ATTEST:

BY _____

Secretary

APPENDIX B
QUANTITIES OF SOLID WASTE EXPECTED AT
THE WEST ROME SANITARY LANDFILL

Population Estimate

According to the 1960 census of Floyd County, 40 percent of the County's population resided within the area served by this landfill. Assuming that this same percentage figure still applies, the service population would now be about 30,000 (based on a present total County population of 75,000).

Studies in other areas have shown that about 3 lb of residential solid waste are collected per person each day. This waste has a density of about 500 lb per cu yd^b when delivered to a landfill (assuming that most of it arrives in packer trucks). This would amount to about 16,000 tons, or 64,000 cu yd, of residential waste per year.

Information on commercial solid waste indicates that approximately 1 lb of waste is collected daily for each person living in the area served.^a The density of this waste is also about 500 lb per cu yd^b as it is also delivered by packer trucks. The amount of commercial solid waste expected annually is about 5,000 tons, or 21,000 cu yd.

Industrial solid waste is collected at a rate of about 0.6 lb per person per day.^a Most of this waste is delivered to a

landfill in noncompacting trucks, and would have a density of about 300 lb per cu yd.^b The amount of industrial solid waste would, therefore, be about 3,000 tons, or 22,000 cu yd, annually.

Demolition and construction solid wastes are usually collected at a rate of about 0.2 lb per person per day.^a These wastes would amount to about 1,000 tons, or 3,000 cu yd, annually, but they will not be accepted at the West Rome sanitary landfill as long as space is available at the City of Rome sanitary landfill.

Street sweepings, brush, and other miscellaneous types of waste are collected at a rate of about 0.4 lb per person per day.^a These wastes have an average density of about 3,000 lb per cu yd when delivered to a disposal site.^b About 2,000 tons, or 15,000 cu yd, of these wastes could be expected annually, but they will also be excluded.

Based on population estimates, the annual amount of solid waste expected at the West Rome sanitary landfill is 24,000 tons, or 107,000 cu yd.

Past Records

Records of the amounts of solid waste received daily at the City of Rome sanitary landfill were reviewed (Table B-1). The City estimates that approximately one-half of the waste delivered by private haulers and from other sources will be diverted to the

TABLE B-1

DAILY VOLUME OF SOLID WASTE PRESENTLY RECEIVED AT
THE CITY OF ROME SANITARY LANDFILL

Day	Volume (cu yd)		
	City	Private	Other
Monday	450	300	300
Tuesday	450	300	300
Wednesday	450	300	300
Thursday	450	300	300
Friday	450	300	300
Saturday	50	300	300
Sunday	--	300	300
Average	330	300	300

TABLE B-2
ESTIMATED VOLUME OF SOLID WASTE TO BE DELIVERED
TO THE WEST ROME SANITARY LANDFILL, 1970

Day	Volume (cu yd)		
	City	Private	Other
Monday	170	150	150
Tuesday	150	150	150
Wednesday	110	150	150
Thursday	150	150	150
Friday	150	150	150
Saturday	20	150	150
Sunday	--	150	150
Average	110	150	150

West Rome site. City trucks that will use the West Rome landfill have also been identified (Table B-2).

Summary

The volume of solid waste calculated from population figures is 107,000 cu yd annually. That estimated from present records is 150,000 cu yd per year. Because Floyd County is more industrialized than the U.S. average, 42 percent of the labor force vs. 25 percent U.S. average, it is believed that more industrial waste will be collected than was shown in the previous analysis. It was decided that the total solid waste volume of 150,000 cu yd would be used for design purposes and that the additional 43,000 cu yd of material would be included in the industrial waste classification.

REFERENCES

- a. Black, R. J., A. J. Muhich, A. J. Klee, H. L. Hickman, Jr., and R. D. Vaughan. The national solid wastes survey; an interim report. (Cincinnati), U.S. Department of Health, Education, and Welfare, (1968). 53 p.
- b. American Public Works Association Committee on Solid Wastes. Refuse collection practice. Chicago, Public Administration Service, Third Edition, 1966. 525 p.

APPENDIX C

LEASE AGREEMENT BETWEEN THE BERRY SCHOOLS
AND FLOYD COUNTY, GEORGIA

GEORGIA, FLOYD COUNTY.

THIS AGREEMENT, Made and entered into as of the first day of November, 1969, by and between THE BERRY SCHOOLS, a corporation organized and existing under the laws of the State of Georgia (hereinafter referred to as "Berry"), and FLOYD COUNTY, a political subdivision of the State of Georgia (hereinafter referred to as "County").

W I T N E S S E T H T H A T :

WHEREAS, Berry is the owner of a tract of land in said county containing 50 acres, more or less, more fully described in "Exhibit 1" hereto attached and made a part hereof, which 50 acre tract is hereinafter referred to as "Tract 1"; and

WHEREAS, Berry also is the owner of a tract of land in said county containing 1.588 acres, more or less, upon which is situated a 6-room frame house, more fully described in "Exhibit 2" hereto attached and made a part hereof, which tract is hereinafter referred to as "Tract 2"; and

WHEREAS, the County desires to lease ten acre strips across said Tract 1 successively from time to time for the purpose of operating thereon a sanitary landfill, and to lease said Tract 2 for occupancy during the term of the lease of any portion of said Tract 1; and

WHEREAS, Berry is willing to make such leases under the terms and conditions hereinafter stated:

NOW, THEREFORE, FOR AND IN CONSIDERATION OF THE MUTUAL COVENANTS HEREBIN CONTAINED, IT IS HEREBY AGREED AS FOLLOWS:

1. LEASE OF PART OF TRACT 1. Berry hereby leases unto said County, and said County hereby leases from Berry that portion of said Tract 1 described as follows:

Beginning at the southeast corner of said Tract 1, and running thence northerly, along the east side of said Tract 1, 348.4 feet; thence west 1250 feet, more or less, to the west side of said Tract 1; thence southerly, along the west side of said Tract 1, 348.4 feet, more or less, to the south side of said Tract 1; and thence east, along the south side of said Tract 1, 1250 feet, more or less, to the beginning point; and containing 10 acres, more or less.

Said leased tract shall be hereinafter referred to as "Tract 1A".

Said Tract 1A is so leased upon the following terms and conditions:

(a) Rental. The rental shall be Two Hundred Fifty Dollars (\$250.00) per year, payable annually in advance by said County to Berry.

(b) Use by County. The County shall use said leased tract exclusively for operating and maintaining thereon a sanitary landfill for the disposal of solid waste products. It is expressly understood and agreed that the County and its officers, agents and employees shall have no hunting rights or privileges upon said leased tract.

(c) Use by Berry. Berry reserves the right to haul to and deposit upon said leased tract, without charge, garbage, ashes, tin cans, bottles and other types of residential, agricultural and commercial rubbish and refuse from its lands and operation, subject to the same rules and regulations applicable to others, except as to charges.

(d) Charges to Others. The County shall have the right to make charges to others (except Berry) for depositing rubbish and refuse upon said leased tract.

(e) Access. The County shall have access to and from said leased tract from the Berry Hill Road over and along that portion of Berry's private road which extends from the south line on said Tract 1 to the north line of said leased tract (which private road is an extension of the Berry Hill

Road and is the eastern boundary of said Tract 1). Berry reserves the right to use said road.

(f) Maintenance of Road. The County shall maintain and keep in a good state of repair, and may pave, that portion of said road over which access is hereby granted.

(g) Gate on Road. Berry shall have the right, at its expense, to erect and maintain a gate across said road at any point north of the north line of said leased tract, and, in Berry's discretion, to keep said gate locked.

(h) Protection of Berry's Adjoining Property. The County shall so use and control the use of said leased tract as not to endanger from fire, or permit rubbish and litter to accumulate upon or otherwise become a nuisance to, the property of Berry adjacent thereto.

(i) Operation of Landfill. In the use of said leased tract as a sanitary landfill the County shall comply with all laws, rules and regulations applicable thereto, and all accepted modern standards of a sanitary landfill operation, including those now or hereafter recommended or required by the Northwest Georgia Regional Health Advisory Council, Inc. (hereinafter referred to as the "Council"), and the county shall, at its expense, furnish all labor, materials, power, machinery and equipment to perform, and shall carry out

(under the supervision of a qualified engineer assigned by said Council to assist in the operation of said landfill so that the same shall not become a nuisance or offense in the area) the following operations and regulations:

(1) All waste accepted by the County shall be thoroughly compacted by equipment of sufficient weight and capacity to carry out said operation.

(2) Mixed solid waste material shall be spread out on the working face of the landfill so that the depth does not exceed a maximum depth of two (2) feet prior to compaction.

(3) The area shall be kept neat and in a sanitary condition at all times, and shall be covered with earth or some other inert material at the end of each day's operation as hereinafter set out in sufficient depth to prevent blowing papers and unsightly condition. The size of the active face on which refuse is being currently deposited shall be kept at a minimum, consistent with an efficient and proper operation.

(4) Cover material will consist of loam, clay, sand, or other acceptable inert materials, such as ashes, cinders, or gravel. A minimum depth of six (6) inches of compacted cover and final spread cover material

shall be kept on all inactive faces of the landfill at all times. The active faces of the landfill shall be covered at the end of each day's operation, with at least six (6) inches of compacted cover material which shall exclude fly ash or other dusty material.

(5) When the fill has been brought up to twenty-four (24) inches below the desired finished grade, it shall be covered with at least twenty-four (24) inches of compacted cover material graded and seeded in such a manner as to prevent erosion.

(6) The County shall erect such temporary and permanent fences or take other measures as may be necessary to reasonably control the blowing of paper and other materials from the landfill.

(7) Burning of material deposited in the landfill will be prohibited.

(8) The County shall provide water under pressure for extinguishing fires in the landfill.

(9) No salvage operations shall be permitted at any landfill site.

(10) Conditions unfavorable for the production of insects and rodents shall be maintained by carrying out routine landfill operations promptly in a systematic manner. Supplemental vector control measures shall be instituted whenever necessary.

(11) Upon the termination of the lease upon said leased tract, if the County has not already done so, the County shall, within thirty (30) days after such termination, bring the surface of the landfill up to the finished grade and seed the same in accordance with the procedures and standards provided in the foregoing Subparagraph (5) and otherwise finish and leave said leased tract in satisfactory condition for the planting of trees thereon by Berry.

(12) All operations and services rendered by the County hereunder shall be performed in a clean, sanitary, neat, courteous and efficient manner.

2. DESIGNATION OF OTHER PARTS OF TRACT 1.

(a) That part of Tract 1 lying immediately north of and adjacent to said Tract 1A, lying between the east and west boundary lines of said Tract 1 and containing ten (10) acres, the north line of which shall extend due east and west, is hereby designated and hereinafter shall be referred to as "Tract 1B".

(b) That part of Tract 1 lying immediately north of and adjacent to said Tract 1B, lying between the east and west boundary lines of said Tract 1 and containing ten (10) acres, the north line of which shall extend due east and west, is hereby designated and hereinafter shall be referred to as "Tract 1C".

(c) That part of Tract 1 lying immediately north of and adjacent to said Tract 1C, lying between the east and west boundary lines of said Tract 1 and containing ten (10) acres, the north line of which shall extend due east and west, is hereby designated and hereinafter shall be referred to as "Tract 1D".

(d) That part of Tract 1 lying immediately north of and adjacent to said Tract 1D, lying within the east, west and north boundary lines of said Tract 1 and containing ten (10) acres, more or less, is hereby designated and hereinafter shall be referred to as "Tract 1E".

3. OPTIONS TO LEASE OTHER PARTS OF TRACT 1. The County shall have the right and option to lease said other parts of said Tract 1 under the following terms and conditions:

(a) Said County may, at any time during the term of this contract, terminate the foregoing lease of said Tract 1A and, effective upon such termination, automatically have, and this shall be, a lease upon said Tract 1B.

(b) Said County may, at any time during the term of this contract after having exercised the option set forth in the foregoing subparagraph (a) of this Paragraph 3 hereof, terminate said lease upon said Tract 1B and, effective upon such termination of said lease upon said Tract 1B, automatically have, and this shall be, a lease upon said Tract 1C.

(c) Said County may, at any time during the term of this contract after having exercised the option set forth in the foregoing subparagraph (b) of this Paragraph 3 hereof, terminate said lease upon said Tract 1C and, effective upon such termination of said lease upon said Tract 1C, automatically have, and this shall be, a lease upon said Tract 1D.

(d) Said County may, at any time during the term of this contract after having exercised the option set forth in the foregoing subparagraph (c) of this Paragraph 3 hereof, terminate said lease upon said Tract 1D and, effective upon such termination of said lease upon said Tract 1D, automatically have, and this shall be, a lease upon Tract 1E.

(e) Any such lease upon said Tracts 1B, 1C, 1D, or 1E shall be subject to all of the provisions of Subparagraphs (a) through (i), inclusive, of the foregoing Paragraph 1 hereof entitled "Lease of Part of Tract 1".

(f) Said respective options to terminate and to lease are inseparable and mutually dependent, and there is no option to terminate a lease upon one such part of Tract 1 without leasing that part immediately adjacent to and north thereof, or to lease another part of Tract 1 without terminating the lease upon that part immediately adjacent to and south thereof.

(g) Said County shall exercise said options only by giving Berry notice thereof in writing mailed by registered or certified U. S. Mail, postpaid, with return receipt requested, addressed to the President, The Berry Schools, Mt. Berry, Georgia, not less than Ninety (90) days before the effective date of said termination.

4. BERRY'S RIGHT TO USE AND TIMBER. Berry reserves the right to use as it sees fit any part of said Tract 1 which is not, at the time, actually under lease to the County hereunder until it becomes so leased. Berry also reserves all merchantable timber now or hereafter growing on said Tract 1 and each part thereof, together with the right to enter upon said Tract 1 and cut and remove said timber at any time, provided, however, Berry shall cut and remove the same in such a manner, at such time or times, and from time to time, as will not delay or otherwise interfere with the County's authorized use of any of said Tract 1 the County then has under lease hereunder. It is understood and agreed that it shall be the right and obligation of the County to do the final clearing of any part of said Tract 1 it shall lease hereunder, and that, in the event Berry has failed to cut and remove any such timber standing upon any particular portion of said Tract 1 at the time the County needs, and has the right, to clear that portion for the County's authorized use thereof hereunder, the County shall have the right, in doing such clearing, to cut and remove the timber then left standing upon that portion of said Tract 1 then being so cleared.

5. LEASE OF TRACT 2. Berry hereby leases unto said County, and said County hereby leases from Berry, said Tract 2 described fully in Exhibit 2 hereto attached.

Said Tract 2 is so leased upon the following terms and conditions:

(a) Rental. The rental shall be Forty Dollars (\$40.00) per month, payable in advance by said County to Berry.

(b) Use by County. The County shall use said Tract 2 exclusively for the residence thereon of an employee of the County, and his immediate family. It is expressly understood and agreed that the County and its officers, agents and employees, shall have no hunting rights or privileges, or right to operate or maintain a sanitary landfill, upon said Tract 2.

(c) Access. The County shall have access to and from said Tract 2 from the Berry Hill Road over and along that portion of a private road of the Berry Schools which bounds said Tract 2 on the south, and that portion of another private road of the Berry Schools which is the east line of said Tract 1.

(d) Maintenance of Roads. The County shall maintain and keep in a good state of repair, and may pave, those portions of said two roads over which access is hereby granted.

(e) Gate on Road. Berry shall have the right, at its expense, to erect and maintain a gate across the road which bounds said Tract 2 on the south at any point East of the east line of said Tract 2, and, in Berry's discretion, to keep said gate locked.

(f) Maintenance of Premises. Said Tract 2 and the improvements thereon, including the frame house situated thereon, are accepted by the County in "as is" condition, and shall be brought to and maintained in a good and safe condition by the County at its expense, and, upon the termination of this lease upon said Tract 2 and said premises, shall be returned to Berry in as good or better condition than the same now are, ordinary wear and tear excepted. No timber now or hereafter growing upon said Tract 2 shall be cut by the County.

(g) Damage or Destruction of Improvements. In the event of any damage to or destruction of any improvement upon said Tract 2 by fire, earthquake, windstorm, lightning, hail or other casualty, such improvement beyond the use of the proceeds of any insurance upon said improvement Berry may receive as a result of such casualty. In the event of any failure of Berry to repair or restore any such improvement, the damage or destruction of which resulted solely from any such casualty, the County shall have the right to cancel this lease upon said Tract 2.

(h) Utilities. Berry shall not be required to furnish water, heat, air-conditioning, fuel, electricity, gas, telephone, sewers, septic tank, sewage disposal, or any other utility or service to said Tract 2 or any occupant thereof, and any such utility or service used thereon shall be at the expense of the County.

(i) Term of Lease upon Tract 2. This lease upon said Tract 2 shall continue from the effective date of this contract until there shall cease to be in effect any lease upon any part of said Tract 1, it being the specific intent hereof that the term of this lease upon said Tract 2 shall not extend beyond the effective date of the termination of the last lease of a part of said Tract 1 hereunder.

6. PLACEMENT OF MONUMENTS. The County will, within 90 days after the execution of this contract, erect concrete markers at the corners of said Tract 1 and said Tract 2 as located by a plat thereof entitled: "Project, Landfill, Berry Hill Road", date 10-23-69, made for Floyd County, Georgia, Dept. of Public Works, by F. E. Evans, County Engineer.

7. INDEMNITY. The County shall indemnify and hold harmless Berry from any and all claims, rights of actions, causes of action, suits and judgments arising from or on account of the injury or death of any person or persons, or the damage to or destruction of

any property arising from or on account of the negligence of or violation of this contract by said County, or any of its officers, agents, or employees, in connection with the use of said Tract 1 and/or any part thereof and/or said Tract 2.

8. CANCELLATION. In addition to any other remedies provided at law or in equity, and cumulative thereof, Berry shall have the right and option, in the event of the violation of any provision hereof, to cancel and terminate this contract at any time after ninety (90) days written notice to the County, mailed by registered or certified U. S. Mail, return receipt requested, addressed to Floyd County, Court House Annex, Rome, Georgia.

9. TERM OF LEASES. The leases herein contained shall expire at midnight on December 31, 1989, if not terminated earlier as herein provided; it being specifically understood and agreed that, in no event, shall the length of the lease upon Tract 2 extend beyond the termination of the last lease upon a part of Tract 1, and no lease upon any part of Tract 1 shall extend beyond midnight, December 31, 1989.

IN WITNESS WHEREOF, the parties hereto have hereto and unto a duplicate original hereof signed their respective names and affixed their respective seals, this 13 day of Nov., 1969.

Joyce S. Morris

W. C. Hall, N.P.

NOTARY PUBLIC, STATE OF GEORGIA

Signed, sealed and delivered
by Floyd County, Georgia, in
the presence of:

Francis R. Davis

W. C. Hall, N.P.

NOTARY PUBLIC, STATE OF GEORGIA

By Horace L. Cline
As Chairman of the Board
of Commissioners

APPENDIX D

SPECIFICATIONS FOR EQUIPMENT SHED AND GREASE RACK AS SET BY THE FLOYD COUNTY ENGINEERING DEPARTMENT

General

This combination equipment storage and landfill office building may be constructed by using a choice of several materials. Some of these may be concrete block, old or new brick, field stone, wood frame with sheet metal, wood or asbestos siding. Sheet metal seems to be the most economical with the roof of sheet metal also. The pitch of the roof should be determined by the geographical location of the structure so as to consider temperature, winds, snow, etc.

Grading

Grading should be done to a tolerance of approximately 1 in. inside the building area with earth sloping away from the building at no less than 1/4 in. per ft.

Building Layout

Layout consist of erecting a few batter boards and pulling taunt lines to establish building perimeter walls, etc. These batter boards should be shot with a builders level to insure accuracy. Caution should be taken as to squareness of corners, etc.

Footings

The depth and width of footings shall be determined by the type of earth the building is placed upon. For a concrete block building a continuous concrete footing approximately 8 in. deep by 20 in. wide should be ample in most locations. Footings need not be continuous through large equipment door spaces. If wood frame or sheet metal walls are used, 12 in. x 12 in. post footings with spread bottoms are suggested at corners and doors. Spread bottom footings may be 24 in. square. The office area shall have a 4 in. concrete slab.

Perimeter Walls

For sheet metal or siding, heavy corner posts and door posts should be placed using medium size post between. One by 6 boards spaced 2 ft on center should be used horizontally between posts to accommodate sheet metal sidings. Eaves of walls should extend 1 ft above door heights to allow for a 1 ft overhang of roof rafters.

For concrete block, no smaller than 8 in. x 8 in. x 16 in. block should be used with steel channel iron door bucks or frames. Block should be jointed with half round jointing tool on outside of wall.

Roof

Regardless of whether sheet metal, roll roofing, or thick butt shingles are used, a deck of not less than 1/2 in. plywood and 30 lb asphalt roll paper should be placed below finished roofing.

Floors

In the area used for parking heavy equipment, 3 in. of crusher run stone should overlay a base of approximately 4 in. of good chert. This chert should be compacted before the stone is placed. Top of stone should come to level of 4 in. concrete slab used for supplies storage, fuel pump, etc. as shown on sketch. Office floor to have 4 in. concrete slab. Bolts 1/2 in. in diameter should be placed in the concrete 30 in. apart to secure rat sill for frame building with sheet metal.

A 5-1/2 bag 3000 psi mix should be used. With 5/6 #10 wire in all floors. Finish of machine storage slab should be a very light broom. Finish of office should be a tight steel trowell.

Doors and Windows

In the machine room, a door 13 ft 4 in. wide by 11 ft high is needed for each machine. In the office, one door 2 ft 8 in. by 6 ft 8 in. with an outside screen door is needed. Wooden inner door should be one half paneled glass and should open against the

partition between office and equipment storage room. Screen door should open opposite wooden door. Windows should be six light, 3 ft by 3 ft, with screen outside.

Lighting and Electrical

Two 8 ft, two-tube flourescent fixtures for equipment room and one 4 ft, two-tube flourescent fixture should be ample for caretaker's office. One 115 V. receptical for office and two for heavy equipment storage should be ample. In some locations, a pole and security light may be needed. Lights should be on separate circuit.

Heating

A small electric heater has proven ample in southern locations for office use.

Fuel Pump and Tank

Pump should be placed just inside building on supply slab in order to prevent vandalism.

The fuel tank should be underground and tied into inside pump. A 2000-gal tank with necessary vents should be ample in most locations.

Water

Where possible, install a water line supplying at least 60 lb pressure near the greasing and cleaning ramp with hose bib type faucet.

Drinking water should be provided if possible. Water for drinking should have periodic bacteria tests.

Grease Rack

These rampways may be built of several materials heavy enough to support weight of equipment, such as steel, concrete, or rubble stone masonry with concrete cap. Running lines of rampway should be not less than 24 in. in width so as to easily accommodate tracks of machines. A distance of 6 ft 6 in. seems best between rack, concrete floor and under structures of machines with a slight drainage to front of rack. The locating of rack into slight hillside works well where feasible. Interior of rack bottom should have slab of concrete 3 to 4 in. in thickness.

Fire Prevention

A CO₂ extinguisher should be placed in each machine storage room.

APPENDIX B

JOB DESCRIPTION - HEAVY EQUIPMENT OPERATOR, SANITARY LANDFILL

Working hours will be a minimum of 40 hr per week present on the sanitary landfill site, or as established by local governmental authority.

The operator, when not engaged in spreading, compacting, and applying cover material, will spend his available time in stock piling cover material and preparing the site for receiving additional waste as outlined in the contract with the governmental agency and the Northwest Georgia Regional Health Advisory Council, Inc.

The operator has a joint responsibility with the caretaker to see that the sanitary landfill site is neat and orderly at all times.

The operator will be responsible for applying sanitary landfill principles and methods of operation as prescribed by the Director, Environmental Sanitation, Northwest Georgia Regional Health Advisory Council, Inc. and in accordance with provisions contained in the contract between the governmental agency and the Northwest Georgia Regional Health Advisory Council, Inc.

The operator will be responsible for the maintenance of the equipment under his care as prescribed by good operating procedures and by the equipment manufacture maintenance guide and additions as may be prescribed by the Director, Environmental Sanitation, Northwest Georgia Regional Health Advisory Council, Inc.

During inclement weather the operator is responsible to see that all surface water is properly draining off the sanitary landfill site.

Every sanitary landfill must have an inclement weather road where collection trucks can operate inside the sanitary landfill without difficulty. The operator will be responsible to separate materials such as, bricks, gravel, cement and other materials that can be used on an all weather road from the refuse and stock pile it close at hand on the sanitary landfill site.

The equipment operator is responsible, along with the caretaker, to see that facilities such as the equipment shed, grease pit, employees' office, communications system, and fire fighting means are properly maintained as outlined in the contract with the Northwest Georgia Regional Health Advisory Council, Inc.

The operator is responsible to see that 6 in. of compacted soil has sealed the compacted refuse before closing the sanitary landfill each day, regardless of weather conditions.

The operator is responsible to see that the equipment and the sanitary landfill site is properly secured at the close of business each day. This is a joint responsibility of both the heavy equipment operator and the caretaker.

The operator will train the caretaker in the operation and maintenance of the heavy equipment so that the caretaker may assist during authorized absences of the heavy equipment operator and as needed.

APPENDIX F

JOB DESCRIPTION - CARETAKER, SANITARY LANDFILL

Working hours will be a minimum of 40 hr per week present on the sanitary landfill site, or as established by local authority.

The caretaker is responsible for picking up all loose paper and debris and keeping the sanitary landfill site neat and orderly at all times.

The caretaker is responsible to see that collection trucks and their operators do not allow paper and refuse to blow out of the trucks along the route leading to the sanitary landfill site.

The caretaker is responsible for the directing of collection trucks to the dumping site as prescribed by the heavy equipment operator.

The caretaker is responsible for the keeping of all records and reports on incoming fuel and lubricants received from local dealers. In addition, he is responsible for keeping accurate record of fuel, oil, and other lubricants used by the heavy equipment.

The caretaker is responsible for carrying out established procedures for weighing, classifying, determining, and record keeping on the amounts of refuse received over a given period of time as prescribed by local authority and the Director, Environmental Sanitation, Northwest Georgia Regional Health Advisory Council, Inc.

The caretaker is responsible to keep other records as directed by local authority and the Director, Environmental Sanitation, Northwest Georgia Regional Health Advisory Council, Inc.

The caretaker is responsible, along with the heavy equipment operator, to see that facilities such as the equipment shed, grease pit, employees' office, communications sytem, and fire fighting means are properly maintained on the landfill site as outlined in the contract with the Northwest Georgia Regional Health Advisory Council, Inc.

The caretaker is responsible to see that no scavenging is allowed at the sanitary landfill site as outlined in the contract with the Northwest Georgia Regional Health Advisory Council, Inc.

The caretaker is responsible to arrange for the placement and daily emptying of an old truck body or other container at the entrance of the sanitary landfill so that dumping may be permitted 24 hr a day by the general public.

The caretaker is responsible to check and see that all security measures are taken to insure that the equipment and the landfill site are properly protected prior to the close of business each day.

APPENDIX G

EQUIPMENT MAINTENANCE DIRECTIVES

June 19, 1969

MEMORANDUM TO: ALL SUPERVISORS OF SANITARY LANDFILLS AND HEAVY EQUIPMENT OPERATORS.

SUBJECT: MAINTENANCE ON SANITARY LANDFILL HEAVY EQUIPMENT.

Maintenance on our heavy equipment is of the utmost important in keeping this machinery operating properly and lasting through the five (5) year period of the Appalachian Program.

During the early months after delivery of our heavy equipment on sanitary landfills, it has been found that maintenance in many areas is far from satisfactory. The responsibility for maintenance rests primarily with the sanitary landfill supervisor and secondary with the operator of that equipment. Operators must realize that the machine that they are assigned is theirs and that they are totally responsible that all maintenance procedures will be carried out as outlined by the Northwest Georgia Regional Health Advisory Council, Inc.

Attached hereto are maintenance schedule forms, by hours, that must be performed by the operator prior to the machinery being put in use. I repeat, this machinery will not be used until such time as maintenance procedures as outlined on the attached forms are conducted. In addition, there is a form

attached hereto for a 500 hour check that must be conducted by a qualified heavy equipment maintenance mechanic. Again I repeat, that this machinery will not be moved until the 500 hour check has been made by a qualified heavy equipment mechanic.

This office will keep a constant check on the maintenance forms to insure that scheduled maintenance is being carried out and the tractors will be inspected periodically to insure that these procedures are conducted as outlined.

If any violations are found where operators and supervising personnel are filling out these forms without actually conducting maintenance procedures, we will take drastic action commensurable with the full power of this office to remove those personnel from their jobs.

Sincerely,

Joseph W. Hunt, Director
Environmental Sanitation

MAINTENANCE GUIDE FOR 500-HOUR CHECK
NORTHWEST GEORGIA REGIONAL HEALTH ADVISORY COUNCIL, INC.

Conducted by City or County Shops

MODEL TD-15 SERIES B
BULLDOZER

DATE _____ EQUIPMENT NUMBER _____

NAME OF QUALIFIED HEAVY EQUIPMENT MECHANIC _____

ITEM	REFERENCE AND INSTRUCTIONS	ACTION TO BE TAKEN	INITIALS HEAVY EQUIPMENT MECHANIC
	Hour meter reading _____ ☐ Every 500 hours of operation		
1. Engine valves	1. Refer to "engine valves" clearance adjustments Section 9 operators manual.	1. Check and adjust clearance.	1. _____
2. Turbo charger	2. Refer to "Turbo charger" section 9 operators manual.	2. Disassemble and clean. Check condition of hoses and replace if necessary.	2. _____
3. Air cleaning system	3. Refer to "Air cleaning system" section 9 operators manual.	3. Check air service indicator to see if functioning properly. Check hoses and replace if necessary. Check nut screws and bolts for tightness.	3. _____
4. Belts	4. Refer to "Belts" section 9 operators manual.	4. Check belts, adjust and replace if worn or frayed.	4. _____

5. Decelerator pedal	5. Refer to "decelerator" section 9 operators manual	5. Check operation and adjust if necessary.	5. —
6. Electrical system	6. Refer to "electrical system" section 9 operators manual.	6. Check proper functioning of generator, cranking motor, and voltage regulator.	6. —
7. Hydraulic system and filters.	7. Refer to "Hydraulic system" operators manual. Item 28 Lubricant EO.	7. Service and replace filters. Check for oil leaks and make repairs. See note #2.	7. —
8. Hydraulic cylinder packing	8. Refer to "Hydraulic cylinder packing" section 9 operators manual.	8. Check for leaks, adjust or make repairs.	8. —
9. Blade cutting edge	9. Refer to "tractor equipment" section 9 operators manual.	9. If badly worn reserve tighten bolts.	9. —
10. Steering planetary brake and pivot brake adjustment	10. Refer to "Steering Planetary brake and pivot brake adjustment" section 9 operators manual.	10. Check and make adjustment if necessary.	10. —
11. Tracks	11. Refer to "Tracks" section 9 operators manual.	11. Check track tension, adjust and torque track shoe bolts.	11. —
12. Transmission, torque converter and hydraulic	12. Refer to "Transmission Torque converter, and hydraulic steering" section 9 operators manual	12. Drain oil from final drive housing, flush out with diesel fuel. Fill final drive to full oil mark then drive machine for about 10 minutes. Drain diesel fuel and fill with EO grade 10, series 3. Change torque converter, steering booster pressure filter elements.	12. —

13. Torque the following nuts, bolts

a. Cranking motor mounting bolts	a. 80-90 ft-lb	a. _____
b. Cutting edges and end bit bolts	b. 650-730 ft-lb	b. _____
c. Diagonal strut cap screw	c. 220-250 ft-lb	c. _____
d. Element hold-down clamp nuts	d. 75 in.-lb	d. _____
e. Engine lubricating oil filter case retaining bolts	e. 15-20 ft-lb	e. _____
f. Fan mounting cap screws	f. 80-90 ft-lb	f. _____
g. Fuel filter case retaining screws	g. 15-20 ft-lb	g. _____
h. Hydraulic reservoir filler and level plug	h. 30 ft-lb max.	h. _____
i. Hydraulic track adjuster socket head screw	i. 10-15 ft-lb	i. _____
j. Hydraulic track adjuster ball check assembly	j. 45-55 ft-lb	j. _____
k. Radiator and air cleaner hose clamps	k. 20-25 in.-lb	k. _____

Page 4

1. Thermostat housing cap screw	1. 33-37 ft-lb	1.	_____
m. Track idler, front idler, and track roller fill and level plugs	m. 15-40 ft-lb	m.	_____
n. Track shoe bolts	n. 160-180 ft-lb	n.	_____
o. Transmission safety filter housing cap screws	o. 33-37 ft-lb	o.	_____
p. Transmission suction filter housing cap screws	p. 33-37 ft-lb	p.	_____
q. Trunnion bolts	q. 420-470 ft-lb	q.	_____
r. Trunnion cap bolts	r. 970-1,090 ft-lb	r.	_____
s. Turbocharger turbine housing lock plate nuts	s. 5-10 ft-lb	s.	_____
t. Turbocharger (compressor housing nuts)	t. 5-10 ft-lb	t.	_____
u. Valve cover screws	u. 10-15 ft-lb	u.	_____
v. Transmission pressure filter case hold-down bolt	v. 10-15 ft-lb	v.	_____
14. Check track roller oil	14. Refer to parts manual for breakdown of track rollers. Lubricant EO grade 30 series 3. See note #1.	14.	_____
	14. Add oil if necessary	14.	_____

Page 5

NOTES:

1. CHANGE OIL IN TRACK ROLLERS EVERY 1000 HOURS OF OPERATION. USE SPECIAL TOOL PROVIDED.
2. CHANGE OIL IN HYDRAULIC SYSTEM EVERY 1000 HOURS OF OPERATION.

A copy of this form will remain on file in the office of the sanitary landfill.

MEMORANDUM TO: ALL COMMISSIONERS, EQUIPMENT OPERATORS AND
CARETAKERS.

SUBJECT: EQUIPMENT MAINTENANCE DIRECTIVE.

As a result of a conference held today with representatives of Tri-State Tractor Company, pertaining to servicing of equipment, the following items were re-emphasized and should be closely followed:

1. Care should be taken to grease all fittings as outlined in the Operators Manual; special attention should be given on all Loaders (150 - 175 & 250) to grease the "roll-back" arms on the bucket.
2. The dry air cleaner should be exchanged for a clean filter weekly (suggest every Monday); the filter removed should be cleaned by air, then stored at equipment shelter for future use. The wet filter back of this dry filter should be replaced when indicated by the filter indicator.
3. We have reports that proper attention is not given to the cleaning of the radiators. All radiators must be checked at least twice daily and sufficient time taken to properly clean, when indicated. TD-15, TD-20, 175's and 250 Loaders have provisions to "swing-out" the oil coolers for cleaning and for exposure of the water cooling unit. Attention must be given to checking and

cleaning the total radiator. Apparently some operators are only checking the center of the radiator and not cleaning the edges and top and bottom. Please make a note on the Time & Cost Record when cooling system is checked and cleaned.

4. At least once each month the tractor cooling system should be thoroughly cleaned using a detergent and hot water, if hot water is available. This can be accomplished by using a "steam-jenny".
5. The operators should pay special attention to the heat indicator for the engine. With normal operations the heat indicator should show on the high side of green. If the indicator goes beyond the green, the operator should stop operations, reduce the throttle to 1/4 speed, let the engine idle at this speed for approximately five (5) minutes before stopping the engine to determine why it is running hot.
6. Every three (3) weeks (or more often if needed) the belly skid under the crankcase should be removed and all accumulated dirt, etc. removed. At this same time the floor boards should be removed and the entire area under floor boards flushed out with water.
7. All belts (fan, generator, etc.) should be checked twice daily, in the morning before start up and at the noon break.

8. Water in the radiator and oil in the engine should be checked twice daily, same time as checking the belts mentioned in #7 above.
9. Checks should be made at the following times of the day (in addition to those mentioned above).

At the end of the daily operation the tractor should be taken immediately to the grease rack for checking underneath the inside of the front idlers, sprockets and all rollers; special attention should be given to the front idler to see that nothing is wound around the idler seals; after checking on grease rack all points requiring daily greasing should be serviced; after greasing the fuel tank should be filled before placing tractor in shelter for the night.

Each morning before start of operations checks should be made on the following: Check radiator, engine oil level, hydraulic oil level; drain from bottom of fuel tank any condensation (water) that may have settled over night (loosen drain plug but do not entirely remove, let drain until pure fuel is flowing from tank).

The battery should be checked at least once each week.

All checks above are the responsibility of the equipment operator but he should be assisted by the caretaker -- this should be a team effort with the caretaker making certain checks while the operator is checking other items.

10. The "rain-cap" on the exhaust should be in place and operating as designed. This rain-cap is very important, it keeps water from getting into the turbo-charger thereby causing it to not function properly. (NOTE: A spare rain-cap has been ordered for each piece of equipment; this spare should be held in reserve at the equipment shelter.)

Sincerely,

Joseph W. Hunt, Director
Environmental Sanitation

APPENDIX H

FLOYD COUNTY ORDINANCE REGULATING SANITARY LANDFILLS

1. Whereas clause:

Whereas, the indiscriminate dumping of solid waste is widespread throughout Floyd County and is causing a serious threat to the public health, and

2. Whereas clause:

Whereas, in these circumstances, and to remedy these unsanitary conditions and protect the public health, the Floyd County Board of Health finds it advisable and necessary to establish regulations to control the methods and procedures for the disposal of solid waste in this county.

3. Now therefore, the following regulations are hereby adopted and promulgated by the Board of Health of Floyd County, governing the disposal of solid waste and the location, operation, and maintenance of all garbage and refuse disposal facilities, activities, and/or procedures in Floyd County, or any municipality located within the county.

Section 1. Definitions: Solid Waste: Garbage, refuse, trash and other solid material including solid waste materials resulting from industrial, commercial and agricultural operations.

- (a) Open dump - Any area or location whereon solid waste is deposited without proper supervision, approval by the County Health Department, or satisfactory control measures to prevent unsanitary conditions.

(b) Sanitary landfill - A type of operation in which solid waste is disposed of by depositing in a controlled area on a specified portion of open land, is compacted by force applied mechanically and then is covered by a layer of earth or other suitable covering material applied daily to a minimum depth of 6", with a final cover of at least two (2) feet depth to be applied at controlled intervals and approved by the Floyd County Health Department.

1. Private Sanitary Landfill - A private sanitary landfill is one which is operated and controlled by a private person or persons, whether for profit or not.
2. Public Sanitary Landfill - A public sanitary landfill is one which is operated and controlled by a public agency such as a municipality or other governmental body.

(c) Open Burning - The process of burning solid waste without the use of an approved furnace or some other control to provide adequate air and combustion.

(d) Person - Any individual, firm, or corporation

(e) City - Any municipality located within Floyd County.

(f) Health Department - The Floyd County Health Department.

Section 2. Disposal of solid waste in open dumps or by open burning^{*} is hereby prohibited.

Section 3. Disposal of solid waste by use of a sanitary landfill shall be governed by the following requirements:

- (a) It shall be the responsibility of any person and/or City operating, or proposing to operate, a sanitary landfill to obtain approval of the site from the Floyd County Health Department. Such approval will be based on: area needed for volume of waste to be disposed of; satisfactory topography of immediate and surrounding areas, availability of suitable covering materials, proximity to residential area, accessibility by all weather roads, satisfactory drainage, compliance with future land use plans and zoning regulations, soil characteristics as determined by test borings, and such other information, conditions, or circumstances as may be determined by the Health Office to be necessary in the interest of public health.
- (b) It shall be the responsibility of any person or City operating a sanitary landfill to obtain all pertinent information, instruction, and guidance from the Floyd County Health Department as to the proper operation of the facility. Proper operation of a sanitary landfill

^{*}To conform with "Air Quality Control" Georgia Department of Public Health Chapter 270-5-24 effective 7-21-68.

will require the following measures to be in effect; control of windblown waste, adequate and sanitary facilities for workmen, fire control facilities, planned location of fill cavities (cells) with established sequence of use, grade control for finished fill as opposed to existing grades, defined hours of operation, methods to be used for controlled depositing of waste, details on available and anticipated equipment (including collection equipment) to be used in the total operation, details on method, frequency and depth of compaction and initial and final cover of wastes, proper dust control, control and abatement of nuisances and placing on file with the Floyd County Board of Health the name and address of the person legally responsible for the operation.

- (c) All sanitary landfills and compost plant facilities will be subject to the continuing inspection and control of the Floyd County Health Department to insure full and continuous compliance with these regulations, and any violation of the regulations by the operator of any such facility will render such operator liable to revocation of his or its permit for the operation thereof, and will render such facility subject to immediate closing

by order of the Health Department and will render the operator of such facility liable to prosecution under these regulations.

Section 4. The Health Department is hereby delegated full and complete authority to enforce and administer these regulations throughout the county and all municipalities therein.

Section 5. Permits: A written permit for the operation of any sanitary landfill will be obtained annually by the operator thereof from the County Health Department, before the 1st day of March for the calendar year of 1969, and thereafter before the first day of February of each calendar year, which permit will allow the operation of such sanitary landfill for the calendar year in which it is issued.

Section 6. Nothing in these regulations shall excuse any person from the requirements of any municipalities or other governmental authority with respect to garbage or refuse disposal, except those which are in conflict herewith, in which event these regulations shall control, and no permit will be issued by the Health Department until all pertinent regulations and requirements of such governmental authorities have been met.

Section 7. Penalties. Any person who violates any of the provisions of these regulations will be subject to those penalties provided by the laws of Floyd County and the State of Georgia for violation of the regulations of the Health Department.

4. Any municipality and/or private contractor who is now operating an open dump or unsanitary landfill for the purpose of disposing of solid wastes from either residential or business areas at the time of the adoption of this ordinance will be given a period of time not to exceed six (6) months in which to either up-grade such a fill to established standards or close such dump or fill according to instructions from the Floyd County Health Department.

Adopted at the regular meeting of the Floyd County Board of Health on January 30, 1969.

James R. Mehaffey, Chairman	/s/	James R. Mehaffey
Sam Garner, M.D.	/s/	Sam Garner, M.D.
Mather Payne	/s/	Mather M. Payne
Harold Lindsey	/s/	Harold Lindsey
Ralph M. Howse, M.D.	/s/	Ralph M. Howse, M.D.

APPENDIX I

ESTIMATED COST OF OPERATION AND OWNERSHIP,
WEST ROME SANITARY LANDFILL, 1970

Land

The annual cost for land is stated in the lease as \$250. An additional \$480 is paid each year for the lease of the caretaker's house and the adjoining property, but is recovered by renting the house.

Site Improvement

The cost to the County of site improvement (clearing, road improvement, equipment shed, grease rack, etc.), including labor, was \$10,000. If a 10-yr life is assumed, this is an annual cost of \$1,000.

Equipment

The total cost of the TD-15B tractor was about \$33,000. If it has a 5-yr life, the yearly cost is \$6,600.

Labor

The annual cost of the equipment operator is about \$6,600 (including fringe benefits) and for the caretaker is about \$5,000 (also including fringe benefits).

Equipment Operation

Equipment will be used 8 to 9 hr per day, 6 days each week. With fuel consumption of about 6 gal per hr, at \$0.20 per gal, this is a daily cost of nearly \$11. For 312 days of operation per year, this becomes an annual cost of \$3,430. Oil, grease, and filters cost about \$1 per day, or about \$310 per year.

Trench Excavation

The cost of the necessary men and equipment to excavate trenches is about \$1 per linear ft to a depth of 10 ft. Annual trench requirements would be about 5,500 ft if this is the only type of operation used. It is estimated that about two-thirds of the total operation will be conducted in trenches, for an average yearly need of 3,700 ft, and a cost of \$3,700.

Overhead

The cost of utilities, supervisor's salary, building and equipment repairs, insurance, and other charges are assumed (by the author) to be 20 percent of the total annual cost. This then becomes \$6,720 (Table I-1).

TABLE I-1

ESTIMATED ANNUAL COST OF OPERATION AND OWNERSHIP,
WEST ROME SANITARY LANDFILL, 1970

Cost item	Amount
Land	\$ 250
Site improvement	1,000
Equipment	6,600
Labor	11,000
Equipment operation	3,740
Trench excavation	3,700
Overhead	6,720
Total	\$33,610
Estimated tons of waste 31,000	
Estimated cost per ton \$1.10	